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TOWN PLANNING

PAST, PRESENT AND POSSIBLE

BY THE SAME AUTHOR

FORMAL GARDENS IN ENGLAND AND SCOTLAND
THE ART OF GARDEN DESIGN IN ITALY, Etc.

THE CHAMPS ELYSÉES, PARIS, FROM THE ARC DE L'ETOILE

TOWN PLANNING

PAST, PRESENT AND POSSIBLE

BY

H. INIGO TRIGGS, A.R.I.B.A.

WITH 173 ILLUSTRATIONS

SECOND EDITION

METHUEN & CO. LTD.
36 ESSEX STREET W.C.
LONDON

First Published . . *July 8th*, 1909
Second Edition . . 1911

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PREFACE

IT was not until the latter half of the last century that the subject of town planning began to be systematically studied. Originating in the far-reaching schemes of Baron Haussmann for the improvement of Paris, the movement gathered impetus with the remodelling of many of the more important cities of Europe consequent upon the demolition of their fortifications. In England, until last year, when Mr. John Burns introduced the Housing and Town Planning Bill, any idea of a systematic treatment of the subject was practically unknown outside æsthetic coteries, and although such matters as public health and restrictive building laws have for many years received great attention, we have yet very much to learn upon the subject of the laying out and development of town areas. The structure of our towns, the development of our suburbs and the creation of entirely new districts have been with us nearly always pure matters of chance. What was a village expands to a town, which in its turn becomes a populous city without any preparations being made for the great

change. As each difficulty arises it has been either quite left to chance, or solved in the best manner of which the circumstances of the moment permit, with little thought for the requirements of succeeding generations. We are beginning to see what the consequence of this state of affairs has been and to gradually realise that a city is not, and ought not to be, a chance aggregation of so many houses, any more than a rational dwelling is a fortuitous collection of bricks and mortar.

The technical literature dealing with town planning is comparatively small and is almost entirely confined to Germany and France. The most important illustrated works are those of Dr. J. Stübben, the distinguished city architect of Cologne, and the late Camillo Sitte of Vienna. The former treated the subject in an exhaustive manner and has dealt with almost every conceivable matter pertaining to city construction. The latter, whose work "Der Städtebau" is not so comprehensive, has dealt with town planning more from the æsthetic standpoint. The work, which was first published in 1889, may almost be said to have inaugurated a new era in the art of city building. Another important German contribution to the literature of the subject is the monthly publication *Der Städtebau*, founded in 1904 by Theodor Goecke and Camillo Sitte. I desire fully to acknowledge my indebtedness to these important works, which have been

of great assistance to me in selecting many of my examples for illustration. In France the interesting pamphlets published by Eugène Hénard entitled "Études sur les Transformations de Paris" are full of suggestion for meeting the traffic requirements of great cities. The superb series of historical maps published by the Paris Municipality offer an example, which might well be followed in other large cities, of stimulating an interest in their growth and preserving valuable records which might otherwise be lost. In Belgium M. Ch. Buls has contributed several interesting pamphlets, and in America Mr. C. M. Robinson has published two popular works, which, together with the founding of clubs and societies for the beautifying of cities throughout the States, has started a crusade that promises to revolutionise city planning in the future.

In England the subject was first seriously considered in the seventh International Congress of Architects held in London in 1906, but with the exception of works dealing with London improvements no general literature has yet appeared. The professional architectural journals have done much to enlighten public opinion. Foremost among these I would specially mention *The Builder*, a journal which for many years past has steadfastly upheld the best traditions of English architecture, and to which I am indebted for much valuable information.

The present work is the outcome of several years spent on the Continent and also of a tour made a few years since when, as holder of the Godwin Bursary of the Royal Institute of British Architects, I was enabled closely to study the methods that have made Paris, Berlin, Munich, and Vienna the beautiful cities that they are. It is hoped that the result will be of use, as a means of reference, not only to those who are called on to act as advisers in projecting schemes of civic improvement, but also to the members of Town Councils, who have so great a responsibility in determining what is to be the future of our cities' development.

I desire to acknowledge my indebtedness to those who by kindly lending plans and diagrams have been of considerable help in the compilation of the work, and especially to Mr. William Atkinson for the diagrams relating to sunlight in streets, to Mr. Halsey Ricardo for his suggested method of street widening, to M. Eugène Hénard of Paris for the valuable diagrams of traffic movement, Mr. John S. Nettlefold, Mr. Raymond Unwin, Mr. W. H. Lever, Mr. Norman Shaw, Mr. W. A. Harvey, for the loan of drawings, and to Mr. W. N. Twelvetrees for the interesting drawings of the gyratory system of traffic supervision.

H. INIGO TRIGGS.

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TOWN PLANNING

PAST, PRESENT, AND POSSIBLE

CHAPTER I

INTRODUCTORY

THERE is no solitude, so philosophers have told us, like that of a great city, and in spite of the old saying, that "God made the country and man made the town," from which we are to deduce that the country is divine in comparison with the town, there is a craving in the minds of the vast majority of mankind for the architectural effects that cities afford. It is an established fact, and one that all past history of the human race confirms, that men prefer city life to country life; hence the great importance to the well-being of mankind that city life be carried on under proper housing conditions, with a view to securing surroundings the most favourable to health. It has been pointed out that the one book in the Bible which, of all others, presents us with a picture of the mystical beauty of the life hereafter, dwells, not so much upon the beauty of the heavenly

country as on that of the heavenly city. This seems less strange, perhaps, when we reflect that to an Oriental mind, accustomed, as it would be, to the squalor of a city, the contrasting idea of clean, well-paved streets would appeal with added force. Aristotle defined a city as "a place where men live a common life for a noble end." How can we accomplish this end unless we make our cities so attractive and so beautiful as to diffuse a beneficent influence over our homes and our entire life? Whatever touches the city touches civilisation itself. It is in the ancient city that civilisation first found its nest; it is in the modern city that civilisation has attained its highest expression. "When nomadic Greeks," says Professor Will, "proceeding on the lines of organic national evolution, massed families into clans or phratries, clans into tribes, and tribes into states, the result of this final aggregation was the famous city-states of antiquity—Ægina, Corinth, Sparta, Athens. And in these communities it was, on the ragged coasts of Hellas, that art, eloquence, poetry, philosophy, reached an eminence that, in some respects, has never yet been surpassed. Proofs of the favoured position of the city's-man may be found embedded in the very warp and woof of language. The 'polished' man lives in the *polis*, the city; the 'urbane' gentleman is from the *urbs;* the 'civil' man is the *civis*, the citizen, the city-dweller; and from the same root comes the word 'civilisation' itself."

When the city societies of ancient Greece fell, it

was that they might give place to another civilisation whose centre and soul was a city—the Eternal City—Rome. Freeman, in an eloquent passage, has declared in substance that it was the vast reservoir into which were gathered all the streams of antiquity, and the inexhaustible fountain from which flowed forth the rivers of modern national life. The City on the Tiber was the mighty heart from which, and back again to which, with tireless diastole and systole, pulsed the life-blood of the ancient world. Rome, in the imagination of the time, was endowed with a charmed life; it was an object of worship; and with its fall, civilisation itself was believed to have perished, to be revived only with the establishment of the Heavenly City, St. Augustine's "City of God."

In ancient and mediæval days, cities were in every sense of the word harbours of refuge; once within their strongly guarded walls the traveller found himself in comfort and comparatively safe from danger.

In the United States, at the close of the Civil War, only about 3 per cent. of the population lived in what might be called cities; and the metropolis, Philadelphia, was a town of about forty thousand inhabitants. In fact, in the modern sense, America had no cities at that time. The great bulk of the people lived in little villages or on solitary farms. To-day. nearly a third of the population of the United States is found in cities of over eight thousand inhabitants, 10 per cent. live in the four cities of New York, Chicago, Brooklyn, and Philadelphia, and the

relative preponderance of the cities is steadily increasing. In Europe this proportion is yet more striking. To-day about three-fourths of the people of Scotland are townspeople, as against one-fourth at the opening of the present century. In England and Wales the urban population is 77 per cent. of the whole, whereas some fifty years ago it was only just over 50 per cent. In France the town population is about one-third; in Germany, fully two-fifths, and in all these countries, as well as in every other European State, the population in towns is increasing much more rapidly than in rural districts. These simple facts are exceedingly significant. They show that the modern trend of life is distinctly urban.

In England, how little has been done to render our towns beautiful! They are regarded only as necessary places for business; they are mostly ugly; efforts are rarely made to render them attractive, unless it be by an occasional avenue or laid out open space. Our provincial towns, especially in the North, are too often places that men are apt to pass through with a sigh, places to be hurried away from without any feeling of regret. Unless by the action of some public-spirited individual, it is indeed rare that any efforts are made by the authorities systematically to render them attractive by sculpture or plantations. Parks and open spaces we have in plenty, probably a larger proportion than any other country, but how rarely does it seem to occur to the authorities that the laying out demands a much higher æsthetic

expression than it usually receives at the hands of the average nursery gardener!

Everybody desires to live in a clean and beautiful town, and if the authorities can provide such surroundings, they not only benefit the inhabitants, but also attract new residents from other places. The rateable value is quickly increased as the town extends, and at the same time the rates are kept at a lower level. Visitors to the town covet the privilege of being residents, and the municipality soon gets a good name. Trade is attracted by the increase of population and by the more amenable conditions of life. In a word, the more agreeable the town is made, the greater is the probability of its becoming a self-contained borough, possessing every means of satisfying the moral, intellectual, and physical demands of its inhabitants, whose artistic needs should be more insisted upon, particularly when financial questions are likely to exercise an undue influence.

The efforts of municipalities should not be confined to matters of hygiene only, but should be directed towards providing everything possible to relieve the dull monotony of the town by preserving spots of beauty, by providing not only wider streets, but better open squares and places, with more sculpture and fountains and more tree-planting.

Hitherto there seems to have been a settled pessimism on the part of the authorities upon the subject of the general aspect of our towns. This is, no doubt, partly due to the fact that councillors,

elected only for a very short period, too often refrain from initiating works of improvement, knowing that in all probability their successors in office will reverse their designs. It is also partly due to the fact that questions of finance enter too largely into the consideration of city improvements. In these matters we are too apt to adopt the "penny wise and pound foolish policy," the reason usually given for the small and mean spirit with which our public improvements are carried out being that it is necessary to wait for times of prosperity (which rarely come) before changes can be made, and when several alternative schemes are brought forward for consideration, it does not often happen that any but the cheapest course is adopted.

It by no means follows that the cheapest scheme is the best, but, on the contrary, it often happens that the scheme which pays best in the long run is that which is far-sighted and conceived upon the broadest and most comprehensive lines. This is well evidenced by the great schemes for the improvement of Paris during the last few generations. Almost all such schemes are remunerative, both in the commercial sense and, much more so, in their general advantage to the city.

The enormous rate at which we are building all over the country should cause every thinking man to pause and consider whether the haphazard systems of town planning have not been followed long enough in this country, and if it is not time that we should take a lesson from Germany and France and America

in initiating speedy reform. From one end of Great Britain to the other, with the exception of a few cities such as Edinburgh, there is hardly a single really good example of town planning.

The speculative builder is not often a man to worry about the monotony of his rows of houses: as a business man he looks only to a quick return for his money, and when he has succeeded in satisfying the authorities as to his drainage scheme, and the general widths of his streets, he troubles little about their planning and is entirely regardless of any future city extensions or the connecting up of adjoining areas. The idea that he is not to be checked and should be allowed to add street upon street to our suburbs without any control has so long prevailed, that such legislation as we may hope shortly to see effected will probably be regarded as an unjust interference with the liberty of the subject. In our suburbs the speculative builder is indeed "monarch of all he surveys." Down go beautiful groups of trees, pleasant groves, and old historic houses, to make way for row upon row of "genteel residences." The trees are ruthlessly cut down and their places occupied by pavements, planted with lamp-posts and laid out as "Parks," "Groves," "Avenues," "Gardens." It has been humorously suggested that in our future dictionaries corrections might be made somewhat as follows:—

"Park," a district closely covered with houses but without either grass or trees.

"Grove," a street of shops with plenty of flaring gas-lights.

"Garden," a collection of houses without a scrap of ground attached to them.

"Avenue," two rows of houses opposite each other with lamp-posts planted at intervals.

It is true that some County and Borough Councils are becoming more sensible of the value of artistic influences and of their importance in trade and commerce, and we have just reason to feel sanguine that the old state of affairs is passing away. After all, it matters not so much where we stand as in what direction we are moving. Although public opinion is not yet ripe for legislation regulating the artistic standard of buildings, a great advance will have been made if the Town Planning Bill now before Parliament should pass into law, and when it has been proved possible to regulate legally the extension of cities, we shall already be several stages in advance of our present condition.

Mr. John Belcher, R.A., recently speaking upon this subject, said [1]: "If legislation is necessary on sanitary matters, that the public may be protected from insidious poisons conveyed through the senses of smell and taste and touch, may it not be equally important to protect the sight? Environment insensibly influences the development of all forms of life, and it cannot be doubted that the squalid conditions, horrid

[1] Address to the Royal Institute of British Architects, November 7, 1904.

forms, inharmonious colours, and injurious sights amongst which such a large proportion of our urban population spend their lives, contribute their quota to the sum total of degenerate moral tendencies, of which recurring acts of crime are the inevitable outcome. Even the untrained have sensibilities to be shocked and blunted, and if the effect of a gloomy and monotonous environment be bad, what shall we say or think about the cumulative moral effect of those wildernesses of mean streets and horrid buildings by which our great cities are disfigured? There must be no concession to what is bad or even mean in architecture if a healthy and manly condition of the people is to be maintained. This aspect of the functions of good architecture should be considered by the authorities who watch over the needs of the community.

"And may it not be that many who do not live in mean streets are yet suffering, perhaps unconsciously, from the conditions by which they are surrounded in the public thoroughfares, their senses assailed by a multitude of petty annoyances amounting in the aggregate to a heavy burden from which they would fain escape?"

In any city improvement it is important that the public who are to contribute the cost should be convinced that such improvement is not only pleasing to the eye, but also attains some practical end; and when this is so, it generally pays up contentedly, with the belief that good value has been obtained

for the money. There is undoubtedly a growing interest in architecture on the part of the public, which is shown in a variety of ways. Within the past quarter of a century things have considerably changed. Then, little restraint was put on those who ruthlessly spoiled our finest old buildings by so called "restoration," but nowadays, thanks to the power of the Press and the greater general interest in architecture, a more discriminating taste for the best modern work is making its influence felt in the demand for a distinctly higher standard. With the increased enlightenment on the part of Town Councils, our cities ought to become what the majority of citizens desire them to be, and what our architects are quite competent to make them.

Although our great Universities, which should lead the way in educating the public in matters of art, have preferred to consider these things subservient to archæology, technical education has stepped in and largely helped to promote an appreciation of æsthetic beauty. The attitude of the Universities towards the teaching of architecture, "the mother of all the arts," has rarely been encouraging in the past; they might do much to promote a better understanding of a subject of which even the educated people in this country have little or no knowledge at all, and, by creating a discriminating taste on the part of the public, enable them to approve what is excellent and reject what is inferior. As a consequence it is lamentable to find in so many educated

Englishmen a stolid indifference to architecture, combined with a feeling that they are fitted by nature to act as critics, a *vis inertiæ* very difficult for the architect to strive against. In the eighteenth century the education of a gentleman was not considered complete unless he had acquired some knowledge of the rudiments of architecture. "Every man," said John Ruskin, "has at some time of his life personal interest in architecture. He has influence on the design of some public building, or he has to buy or build his own house. It signifies less whether the knowledge of other arts be general or not: men may live without buying pictures or statues, but in architecture all must in some way commit themselves: they must do mischief and waste their money if they do not know how to turn it to account. And it is assuredly intended that all of us should have knowledge in matters with which we are daily concerned."

The first step to be taken in dealing with city improvements is to endeavour to obtain more continuity of idea and effect in joining together and dealing with the important public centres; they should more often be linked up and treated as an entire whole, instead of as a number of insignificant units. Then, all our larger towns should formulate schemes for bringing their suburban districts into closer union with the centres; much greater attention should be devoted to suburban extension, and from hygienic reasons every effort should be made to place the buildings farther apart and to make the open

spaces more extensive the farther they are removed from the civic centre.

Mr. Ernest George recently drew attention to the extraordinary rate at which London is being rebuilt, especially in the central part.

"On what principle," he asks, "is this rebuilding being done? Is more forethought being expended than in former centuries? Is the laying out of new streets on large enough lines to free the constriction of the ever-increasing traffic, to admit of abundance of light and air to the overcrowded areas, and to obtain Heaven's blessing of green leaves and trees in our main thoroughfares? Is any shelter from rain and snow thought of for pedestrians? Are our open spaces, bridges, and approaches to be properly designed and laid out by our most capable men, or left to the chance ideas of the subordinates of our County Councils and other authorities? The time must come when the rebuilding of London for its enormously increasing population must be proceeded with in real earnest, not merely in the childish way of pulling down at intervals a few squalid neighbourhoods, and running new streets on chance lines through the clearing, as being the cheapest method of making a small improvement, and on designs obtained by ill-considered methods, with no definite intention of carrying them out. Is new London to be allowed to grow up with as little apparent design as a vegetable—controlled by a thousand influences, some hidden, some vainly directed? Or is it to be on an

imperial, necessary, convenient, healthful, and tasteful plan, properly thought out and laid down beforehand by competent hands, and rebuilt under a wise control? If the latter, it is time energetic steps were taken to arrange for it, and the best architects and engineers asked to collaborate in the matter. Our main thoroughfares, narrow and choked with traffic, dangerous to life and limb, wanting in light and air, are gradually being reconstructed on almost the old lines, subject only to the improvements in construction and to regulations as to heights insisted on by the London Building Act. They are unhealthy by overcrowding; the wood paving alone, through insufficient cleansing of the dust impregnated with impurities, is causing new diseases of eyes and throat."

It is not agreeable to reflect that London, the largest city in the world, is in proportion the worst provided with facilities for locomotion, that practically none of its streets have been laid out upon a definite plan, and that the great trunk roads communicating with the outside country are often miserably bad, narrow, and crooked. Public attention was drawn to this state of affairs when, in 1903, the Royal Commission on London Traffic was established. For two years the Commission patiently investigated almost every phase of the traffic problem, and finally were unanimous in recommending the establishment of an independent Board to whom all matters connected with metropolitan traffic might be referred, and upon whom ample powers should be

conferred, so that projects calculated to benefit the population of the largest city in the world might be approved, if found good, without the obstruction of too interested landowners or the costly delay that invariably attends Parliamentary sanction under existing circumstances.

An advance was made when in 1907 the Board of Trade decided to constitute a temporary branch for the purpose of dealing with the traffic of London and other districts, so far as they are under the control of the Board, the object being to ensure that, pending the establishment of a Traffic Board, the valuable evidence collected by the Royal Commission should be kept up-to-date. But this branch does not, of course, interest itself in either the æsthetic or the practical part of the great subject of town planning. Although the Board of Trade will doubtless be able to deal advantageously with many matters affecting the traffic problem, the new department cannot possibly perform all the duties awaiting attention, and the statement made in 1907 that the Board of Trade will report to Parliament yearly on the needs of London traffic seems simply an attempt on the part of the Government to shelve all the great questions that have been raised.

It is with a feeling of considerable apprehension that we consider the future of Greater London after the evidence of the London Traffic Commission. It is sheer avoidance of inevitable responsibilities to neglect the warnings that are before the eyes of every

thinking man in England, and unless some active measures are soon taken one dreads to look forward to the conditions of not only London, but of all our large cities in the future.

Even though it may be impossible to-day to effect any of the great changes deemed essential in the Commission's Report in London or in Greater London, there is still plenty of time for comprehensive schemes to be laid down for the future development of Greatest London—that is, the London of the Metropolitan Police Area, which practically covers the whole of the ground lying within a fifteen-mile radius of Charing Cross. Twenty years have passed since the formation of the London County, which was brought into existence in 1888, and which mostly lies within the six-mile radius. The great feature of these twenty years has been, not so much the filling up of Greater London as the overflowing of the population into the fields beyond, where, owing to a greater appreciation of the value of space and pure air and the wonderful improvement in the means of cheap and rapid transit, the growth has been astounding. Willesden is a notable case in point. When the boundaries of the London County were drawn, Willesden was little more than a small town ; now it has attained the proportions of some of our largest cities.[1] Surely no time should, therefore, be lost in preparing most compre-

[1] In 1801 the population numbered less than one thousand, in 1881 it had risen to twenty-seven thousand, and to-day the population amounts to over one hundred and fifty thousand.

hensive schemes for the joining up of Greatest London ; it is sure to spread further yet, and there is still room between the ten and fifteen mile radius to absorb a gigantic population.

Many valuable lessons might be taken from the great extension plans that have been prepared for some of the German cities. In the case of Munich, a few years ago, an important competition was held between the leading engineers and architects, and substantial prizes were awarded to the authors of the premiated designs. A fine scheme was evolved to deal with the probable developments of at least a century, and this scheme is now being worked upon. Would it not be possible and advisable for London and every large provincial city to appoint Commissions and institute similar competitions amongst experts, which would certainly stimulate the public to take more interest in the subject? Adequate prizes should be awarded to the competitors, and a final selection having been made from one or more of the schemes, the successful competitor should be invited to elaborate his plan, with a view to its being adopted in all future plans of extension.

The obstacle to this course being adopted is the difficulty under which we labour in this country of compelling people to sell their property for public improvements. As matters stand at present it is generally necessary for public bodies to keep secret their improvement schemes, in order to prevent property from unduly increasing in value. Before any

great advance in the planning of our towns can be hoped for, the whole question of the expropriation of property will have to be seriously considered, as until municipalities are able to safeguard themselves on this point, all extension plans must be simply castles in the air if the legal means of carrying them out are lacking, and if, as is often the case, a few obstinate individuals have it in their power to prevent an improvement scheme from being carried out. The solution, perhaps, would be to take the valuation of every property as being that set upon it by the owner for taxation purposes, before the scheme is first mooted, adding in the case of land compulsorily purchased a sum of, say, 10 per cent. of the valuation. But in any such scheme every effort should be made to preserve, whenever possible, the existing boundaries of property, and, where it is necessary to cut a road through a number of small sites, to see that oblique plots are avoided.

At the present time, the laying out of our cities is left far too much in the hands of the city engineer and surveyor to local authorities. There is, of course, no reason why these officials should not carry out improvement schemes if they are able to do so; they are often men of considerable capacity, their calling demands the exercise of high skill and ability, but they are too wrapped up in routine work and are liable to get into official grooves, and having rarely had the advantages of a properly informed architectural education, they are hardly the best advisers in matters

of town planning and improvement, for the ultimate success of which the best architectural skill is necessary. Moreover, there is probably no officer of public or private service who is already called upon to perform so many varied duties, and to know something about the details of so many complex technical problems, as the British municipal engineer.

By temperament, training, and actual experience the average borough surveyor and engineer is apt to be unsympathetic to the architect's point of view. There is often a tendency for his idea of civic improvement to be one-sided and narrow. He attaches too much importance to facts and leaves no room for imagination. Official architecture almost invariably bears its stamp upon it; we see this in the case of the post-office buildings of every large town, all designed on one commonplace office pattern instead of being the works of architectural interest and individuality which they might be.

Now, whither do all these considerations lead us? It must be evident to every thinking man who looks around him and compares the lack of interest taken in civic problems in our country with the way in which the question of city planning is being handled in America and Germany that some such control as these countries have already adopted must be instituted in the near future.

Let us briefly consider the state of London, which, being the Metropolis, naturally comes first to our thoughts. In the past London has suffered terribly

from the want of a broad view being taken of its probable development and from the lack of definite schemes being laid down for its beautifying and improvement. If the vast possibilities created by the Great Fire in 1666 had been taken advantage of, and the plan which Sir Christopher Wren devised had been acted upon, London would be counted to-day one of the most beautiful cities in the world, and St. Paul's Cathedral, instead of being hemmed in on all sides by shop property, would have stood in the midst of a fine oval place approached by a broad roadway from Ludgate, instead of narrow Fleet Street with its disfiguring iron railway bridge. Again, instead of the miscellaneous collection of riverside warehouses, a broad embankment would have bordered the river from Blackfriars Bridge to the Tower. But the golden opportunity then lost is hardly likely to return.

The rapidity with which not only London but all our cities are increasing makes this question of their extension one of the most serious and important municipal problems of the day, and sooner or later considerably increased powers will have to be given to the Councils for the greater and more efficient control of the laying out of new areas, the provision and treatment of public places, the formation of new thoroughfares, and, what is also of great importance, a more effective control over the elevations of the buildings themselves where they front on to important thoroughfares. Had such a controlling power been exercised in London, we should not have had be-

queathed to us such a medley of commonplace and incongruous buildings as may be found in Shaftesbury Avenue and Charing Cross Road. The architectural opportunities which these streets afforded might have had, under proper control, a magnificent result. Since these streets were laid out it is gratifying to see that things have somewhat changed and that the architectural condition of our new streets is not wholly unconsidered, for the London County Council has to some extent realised the importance of exercising control over the design of buildings fronting an important thoroughfare. In the Kingsway, connecting Holborn with the Strand—an improvement involving an expenditure of over five millions sterling —the Council showed a desire to emulate the Regency of a century ago by endeavouring to treat a great public street with becoming architectural dignity.

Starting with the praiseworthy idea of one grand architectural scheme for Kingsway and Aldwych, they invited architects to send in competitive designs, and at the same time applied to the Royal Institute of British Architects for advice whilst the scheme was in the early stages of development. The advice was, of course, most readily given, but was not acted upon, for when the Council had their suspicions aroused that some difficulty might be expected in letting the building sites if tenants had to conform their buildings to a general design, they allowed their scheme to collapse, thereby setting a very bad example to other municipalities. In this case, they had the power in their

hands to make a great architectural improvement, but were unable to follow the sound advice of the Institute, not apparently from want of will, but rather from want of power and backing up, which might have been supplied by a more recognised authority, such as a Ministry of Art. As might have been expected, the Finance Committee showed but little sympathy with artistic ideals. Yet artistic treatment has a financial value of its own, as owners of property are beginning to find out; for where the requirements of art are listened to, property becomes more eagerly sought after and its value increases accordingly.

London has rarely been fortunate in the situation of its important public buildings, and it has too seldom been realised that these should not only be beautiful in themselves, but should be so placed that their beauty can be properly seen from as many points of view as possible. The fine pile of the Law Courts, for example, is lost through the spectator's inability to obtain a proper perspective view; the Bank of England, to the million who daily pass it, is nothing but a wall, and the Marble Arch has, since its erection in 1851, failed to stir the faintest emotion. How heterogeneous a composition is that formed by the Wellington Monument, Hyde Park Corner and the Wellington Arch, where the space is cut up into irregular leg of mutton shapes and the Wellington Arch placed upon the shoulder of a curve! Such an arrangement of a site would incur ridicule in Paris, but it seems quite to satisfy Londoners. What lessons might be

learnt of the value of vistas and axial lines from a study of the plan of Paris! The beautiful Opera House, so placed that it forms an effective termination to the vista of several important streets, or the wonderfully commanding position of the Arc de l'Étoile, or the vista from the Chambre des Députés across the Seine and Place de la Concorde to the superb portico of the Madeleine!

In this country we seem to have no notion of placing a building so that it should be axial to an important thoroughfare. The approach to such a building as the British Museum is miserably poor. Compare, for instance, the position of our Law Courts with such a well placed example of stately architecture as the Paris Palais de Justice or that of Brussels; or the Covent Garden Theatre, facing sideways on to a second-rate street, with the Paris Opera House facing down the broad Avenue de l'Opéra! Compare the Marble Arch, designed with no reference to any of the adjoining thoroughfares, with the Arc de l'Étoile! These are all mistakes of several generations ago, but to come nearer our own time, what magnificent opportunities have been lost in the planning of South Kensington, where a whole modern estate of important buildings has recently sprung up between the Albert Hall and the Cromwell Road. What a splendid opportunity has been missed here! The site was already cleared and there was no lack of funds. The roads, as they stand, are of magnificent width, and the buildings are of the most costly character,

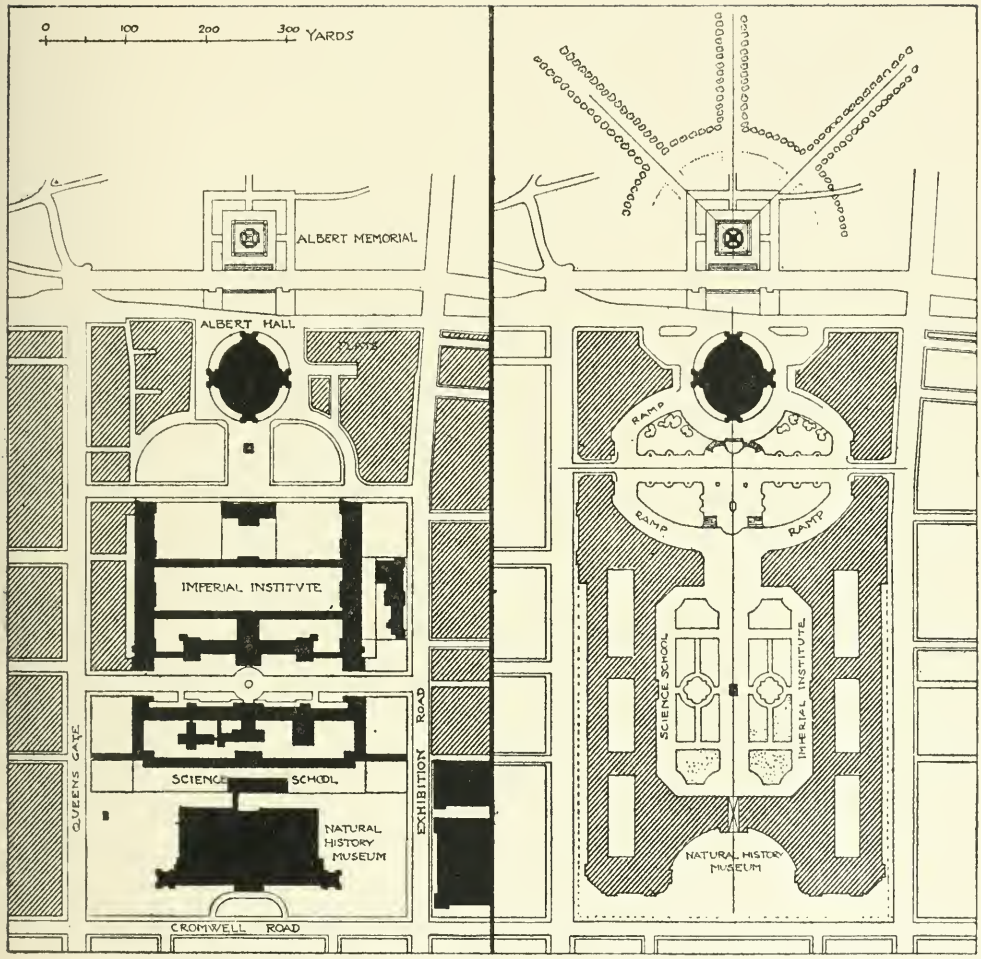


FIG. 2.—SOUTH KENSINGTON AS AT PRESENT LAID OUT

FIG. 3.—SOUTH KENSINGTON AS THE BUILDINGS MIGHT HAVE BEEN GROUPED

but instead of endeavouring to deal with the site as a whole, it has been simply treated as a speculative builder might be expected to treat a suburban building estate. The buildings include the Albert Hall and Memorial, the Natural History Museum, the Imperial Institute, and the Victoria and Albert Museum, all buildings of considerable importance, and there are also other buildings, such as the two Colleges of Science, the Royal College of Music and the City and Guilds Institute, which, though smaller, might well have been considered in one effective group. Compare the position for one moment with the Maria Theresien Platz in Vienna, where great museums have been grouped around a central square, and see what a magnificent place might have been created if a little more foresight had been used, and the Natural History Museum and Royal College of Science placed at right angles to the Imperial Institute instead of running parallel to it. Surely it is time we had some qualified Commission to see that other great opportunities are not missed in future, and although we can never have the beautiful London that Sir Christopher Wren would have given us, we may yet in time have a London of which we may feel justly proud.

In the matter of public open places, London and, indeed, nearly all English towns are better off than the majority of great cities on the Continent; but we have signally failed to make the best use of them, and when we see in Paris or Vienna how beautiful an adjunct they may be, we are inclined to agree with

Disraeli, who said that the London squares reminded him of a large family of dull children with Portland Square and Portland Place for their respectable parents. However, we may be thankful that we possess them, and their dulness need not be an incurable matter.

The London square is essentially different from either the French *place*, the German *platz*, or the Italian *piazza*. Hitherto it has been regarded as essentially a residential square, consisting of houses built round a garden over which the residents have a sort of prescriptive right. Lincoln's Inn Fields and Covent Garden, both the work of Inigo Jones, were the earliest of the London squares to be laid out. They were followed by many other delightful squares, the outcome of the building activity of the eighteenth century. Many engravings exist which show that in nearly every case these squares were laid out in a formal manner, no doubt best suited to the surrounding architecture, and where trees were planted, they were placed in formal rows in accordance with the gardening taste of the day. Substantial piers of rubbed brick or stone with handsome lead terminals or vases and a wrought iron railing of good design, or even a painted wooden rail, gave a much more refined aspect to the square than the badly designed cast-iron railings that have taken their place nowadays. An old view of Grosvenor Square shows the central garden laid out with a small square lawn, in the middle of which stands the statue of George I.

surrounded by flower beds arranged in an elaborate, but formal, pattern.

The modern open space movement may be said to have started in 1842 with Sir Edwin Chadwick's report on the "Effect of Public Walks and Gardens on the Health and Morals of the Lower Classes." He strongly advocated the preservation as public open spaces of disused burial grounds, and it was greatly due to his reports that most of these graveyards were closed in 1853 and the succeeding year, though another twenty-two years elapsed before any of them were converted into public gardens. In 1855, when the Metropolitan Board of Works was formed "for the purpose of carrying out any work for the improvement of the Metropolis or public benefit of the inhabitants thereof," with the exception of the parks, Kensington Gardens, and Primrose Hill, there were no pleasure grounds in London under the control of a public authority. Now, in London alone, there are over one hundred garden places open to the public.

In 1863 the Gardens in Towns Protection Act was passed, which empowered the Metropolitan Board of Works to provide for the proper maintenance of such public gardens and open spaces "set apart for the private use of residents in any square or other public place which might become neglected." But though this Act of 1863 was a distinct advance upon the previous condition of things, it aimed at merely preserving, in the event of private ownership proving ineffectual to deal with private property. In 1866,

the Metropolitan Commons Act was passed, having for its object the protection for the public of the forests and commons around London. So far as it went this was a most important piece of legislation; but a further Act, passed in 1873, greatly extended the powers of the Metropolitan Board, authorising it to purchase any saleable rights in commons, with a view to preserving such places intact for the use and enjoyment of the public. It was not, however, until a series of Acts known as the Open Spaces Acts, passed at intervals between 1877 and 1890, became law, that a really appreciable advance was made. These Acts, in addition to that of 1906, have enabled the London County Council to preserve existing open spaces, and also to acquire parks and lesser areas, in conjunction with the various Metropolitan Borough Councils in whose jurisdiction they may be. In 1907 the control of the London County Council extended over no fewer than 110 parks, gardens, churchyards and open spaces, having an aggregate area of nearly 5,000 acres.[1]

A great deal of credit for this improved state of things belongs to such societies as the Commons Preservation Society, the Metropolitan Public Gardens Association, and the open spaces branch of the Kyrle Society, who have, by their labours and their example, succeeded in stirring up such public authorities as H.M. Office of Works, the London County Council,

[1] See "London Parks and Open Spaces," published by the London County Council, 1906.

and the metropolitan vestries, as well as County Councils and municipal bodies in the provinces.

It will thus be seen that in the provision of open spaces for public enjoyment this country has amply met the requirements for many years to come.

In the United States during the last fifteen or twenty years the question of civic improvement has created much interest and enthusiasm. A very wholesome form of city pride has developed that bids fair to secure for American cities the first place in all that makes for stateliness and convenience; for the Americans have shown themselves capable not only in all questions of practical utility, but have of late years shown signs of developing considerable skill in the arts, and especially in that of architecture. Vast sums of money have been expended, and it is encouraging to note that much of the work has been planned by skilled experts, who have shown foresight far in advance of the requirements of the day. A number of societies have been formed throughout the States, whose object is to foster and encourage public interest in civic improvements, and very much has been written upon the subject.

Washington has adopted a most elaborate and comprehensive plan, prepared by a commission of experts, which will require many years for its completion and an enormous expenditure. A report recently published deals with the improvement and development of the city and suburbs by laying out the whole

upon a large and comprehensive scale. A small committee of experts, consisting of two architects, a leading sculptor, and a landscape gardener, was appointed to prepare and submit a general plan for the development of the city, and, at considerable private sacrifice, these gentlemen devoted nearly a year of their time to studying the question. A short tour of the principal capitals of Europe was made and then a comprehensive plan was produced, fully illustrated by drawings and models. The committee describe the realisation of the scheme as a stupendous task, much greater than any one generation can hope to accomplish, but they add that the hearty and intelligent co-operation with which the plans have been received by the officers of the Government, the Committee of Congress, and the public generally, makes it practically certain that the development of the national capital will be eventually prosecuted on the lines proposed. Many stubborn attempts that have been made to erect Government buildings on sites that would have interfered with the plan of the Commission have, fortunately, been frustrated, chiefly owing to the influence of President Roosevelt. The city of Washington has been effectually rescued from a state of chaos which threatened to obliterate the noble lines on which it was originally planned. A further effect is that a standard has been set which is not without influence on municipal matters throughout the country. Washington has become an object-lesson in efficient local administration, and the policy which included the

special care of the capital among the highest affairs of state has been justified by the result.

The case of New York is an extremely interesting study in the replanning of great cities, and deserves special consideration. New York was originally laid out upon the absurd gridiron plan, all the streets, with the exception of Broadway, being planned in rectangular blocks with hardly any open squares or important centres of distribution; an idea, we regret to say, which still finds favour in our own colonies. With a view to remedying the mistakes of the past and to making New York a more comely and convenient place of business and residence, a movement was initiated by a body of municipal reformers, which after a short time was officially recognised, and culminated in the appointment of a City Improvement Commission to deal with some of the more serious problems arising from the inconvenient lay out. About a year after its appointment the Commission made its preliminary report, containing many very excellent suggestions.

The result of their labours was published in a handsome volume, which failed to provoke any popular interest, and there is little reason to suppose that their recommendations will carry any authority in whatever schemes for improvement the City of New York may have to deal with. This failure was principally due to the obstacles engendered by the existing legal constitution and financial condition of New York, and also to the character of the Commission, who did

not carry with them the influential support of public opinion, and who apparently felt there was little chance of their recommendations being carried out.

At Cleveland, Ohio, a magnificent plan has been devised for grouping the principal public buildings. The city is singularly fortunate in that new public buildings for the Government, the county, and the municipality were required at the same time, making a union of the various interests practicable as well as desirable. Like Washington, the city is also fortunate in that the railway companies are willing to work in harmony with the general plan.

Great fires in cities, although they must be regarded as grievous afflictions, have sometimes offered peculiar opportunities for the correction of many faults in the original designs of a city. Thus, Baltimore has taken advantage of the opportunity presented by the great fire to widen fifteen streets within the burnt districts to the extent of about eight acres. Notwithstanding this reduction in the available building area within the district, there has been a large increase in the value of the remaining property. On the other hand, in the case of San Francisco, when in 1906 the most favourable opportunity presented itself and the city was laid low by the flames, the authorities quite failed to rise to the occasion. Strange to say, for several years previous to the disaster a commission had been engaged and much money had been spent in elaborating plans for a really fine city. These had actually been adopted by the municipal authorities

before the fire occurred, but owing to lack of confidence in the city's administration and a preponderating feeling amongst the landowners that commercial considerations should take precedence over mere questions of beauty, the advocates of the plan succeeded in securing the adoption of hardly any of the measures that would have made San Francisco one of the finest cities in America.

To Paris belongs the honour of having been the unrivalled leader of European cities in effectually transforming the labyrinthine tangle of narrow mediæval streets into broad modern thoroughfares. Vienna and Berlin have also accomplished magnificent results in city-making, but Paris was the pioneer, and her municipal authorities, acting under the guidance of Baron Haussmann, were the first to conceive the ideas of symmetry and spaciousness, of order and convenience, that have made Paris the finest city in the world.

If we enquire into the causes that have produced so fine a result, we see at once that it has been brought about by strict building regulations, which have taken into consideration other things beyond hygiene and the public safety. The municipality have always deemed it their duty to enhance the beauty of the city, and the rights of individuals have been curtailed to this end. They have always lived ahead of their time, and the result of this foresight, as of all foresight in civic matters, has not only been an increase in dignity and beauty, but, in the case of

Paris, an increase in material prosperity as well. There is, moreover, both in France and Germany a municipal spirit which at present does not exist in England, and as long as this municipal spirit remains undeveloped, we cannot look for any considerable progress to be made, and the idea of leaving so much to private endeavour prevents any wide view being taken of civic improvement. In many of the municipal improvements that are carried out in Paris, the plans have been prepared and decided upon many years in advance. Thus when the Champs Elysées was first laid out, the radiating avenues leading from the Place de l'Étoile were placed on the official maps, and although it has taken many years to achieve, every one of these avenues has at last been completed with such modifications and improvements as conditions may have required from time to time.

The systematic method pursued in Paris is worthy of close attention. In the first place, an official plan is kept up of the whole city, and all schemes of contemplated improvements, involving in any way the beauty of the city, whether it be in the laying out of an important public street, or in drafting new building regulations, or the situation of an important work of art, are reported upon by special commissions of experts at the call of the Prefecture of the Seine. Artists, whether they be painters, sculptors, or architects, consider it an honour to serve on these commissions and give the best of their ability to the public service without remuneration. For instance, the Paris

building laws were revised in 1896 on the report of a commission which consisted of the following official persons :—Two municipal councillors, the chief of the department which deals with building lines, the chief engineer, the chief inspector and the honorary architect to the town of Paris. In order that the committee should not be composed of officials only, to these seven were added the names of sixteen outside architects of distinction, so as to ensure to the town the best ability (which is not generally willing to submit itself to the trammels of an official position).[1] Such a commission, as may be imagined, carried sufficient weight to enable it to advise on other matters beyond those immediately affecting the health and safety of the public, and to impose a number of æsthetic restrictions on buildings, with a certain knowledge of the final effect to be produced. In street improvements no secret is made of their direction and extent, and proposed widenings and new streets are clearly marked on the large scale maps issued by the "Service du Plan de Paris," corresponding to the English Ordnance map, even although it may be twenty years before the changes can be carried out. Owners of property cannot sell the land scheduled, and must submit for approval plans of any alteration they propose to make to their buildings. It thus

[1] Contrast this with the Royal Commission on London Traffic which sat to enquire into the whole question of the future planning of London's streets. In the *personnel* constituting this Commission the architectural profession was entirely ignored, neither did any architect appear before it to give expert opinion.

becomes impossible for any new building or costly alteration to be erected or carried out upon land that will be ultimately required. This state of affairs is so far beyond what we have attained to or see any prospect of attaining to in our large English cities that we can only regard it with rather hopeless envy.

It has always been the custom to employ good men on the public works in Paris. When Baron Haussmann first took over the direction of affairs in 1853, he created a corps of public architects, recruited from the foremost graduates of the École des Beaux Arts, and in the list we find the names of some of the best men of the day. The education which is given, both at the Beaux Arts and the school attached to the Département des Ponts et Chaussées, results in turning out a most useful type of official. The Département des Ponts et Chaussées is an institution dating from the time of Louis XIII., when it was first organised in a rudimentary form. As is the case with other similar organisations in France, there is not only a Government Department, but a school for the preliminary training of future officials (an idea which might be followed with great advantage in England and America).

Paris has, also, been fortunate in the fact that the great Exhibitions held there from time to time have always been the means of adding to the city some new municipal feature of a permanent character, so that after the Exhibition is cleared away the city

FIG. 4.—A SECTION OF THE MUNICIPAL PLAN OF PARIS SHOWING HOW FUTURE STREETS AND BRIDGES ARE FORESHADOWED ON THE OFFICIAL PLAN.

has gained either some beautiful building, or a park or an avenue. Thus, the lower end of the Champs Elysées was developed at the close of the first great Exhibition. The second and third Exhibitions produced the Trocadéro, and to some extent the development of the Champ de Mars, and the last Exhibition of 1900 gave to the city the two art palaces and the Pont Alexandre III.

In Italy many of the larger cities have a "Commissione Edilizio," which has almost exactly the same function as the Art Committee of the Paris Municipal Council.

Nowhere has the subject of town planning received more careful attention than in Germany, where for many years the foremost architects of the country have given much thought to the subject, and where the State practically compels municipalities to own land for public improvement and has issued instructions that no opportunities should be missed by them in getting land into their possession. In some cases where towns are rapidly increasing the authorities have been required to prepare a building scheme several years in advance, dealing with the areas likely to be built over, and considerable powers have been given them to acquire land for playgrounds and open spaces, the provision of wide streets and boulevards, &c. Moreover, where it is found that owing to the irregular shape of areas or for other reasons it would be an advantage to deal with the areas as a whole, they are authorised to combine a number of small plots

for the purpose of the building plans, and after the area has been laïd out as a whole, the land can be either expropriated or apportioned for building purposes between the owners of the original properties.

The city of Berlin since 1862 has had a system of street planning which, when once fixed, is rigidly followed until changed conditions make variations necessary. A claim of an owner that his property is depreciated in value does not meet with the consideration it would in this country, the general good of the majority being the first thing kept in mind. Berlin, unlike Paris, gives no power to its Council to regulate the external appearance of buildings.

In Ulm wide streets of heavy construction are developed only for main traffic ways, while narrow streets of cheaper construction are used for all the residential parts of the city. Ulm considers the land policy to be at the root of the housing question. In 1904 it owned 60 per cent. of its area, while in 1906 it owned about 80 per cent. It is thus in a position rigidly to control its improvements. The city is continually buying land, and recently bought the old fortification, thus bringing into use a large amount of private land that was not before available. In order that it might share the increased valuation it secured a law giving to it a part of the increased value. The city controls land speculation by reserving the right to buy back all land within a hundred years at the price at which it was sold. The scheme generally followed to prevent overcrowding is to allow 20 per

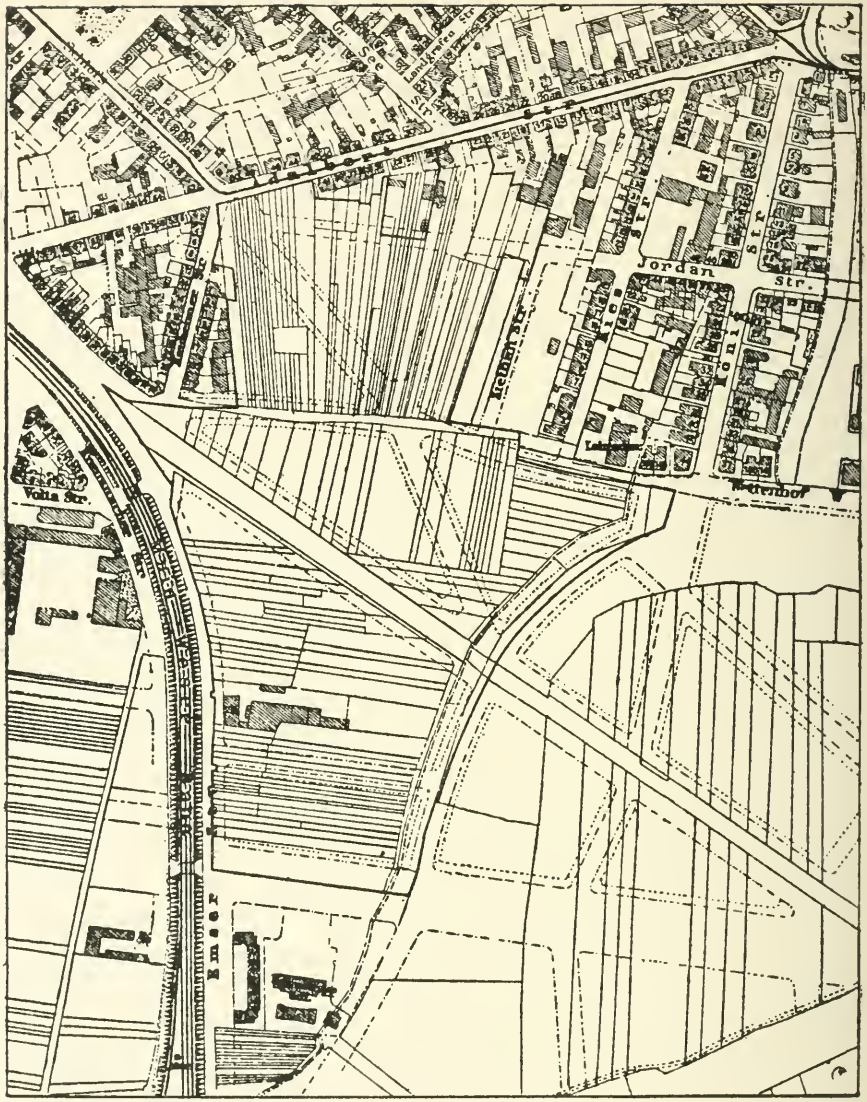


FIG. 5.—A FRANKFORT BUILDING ESTATE, COMPRISING THIRTY-FIVE ACRES AND OWNED BY FIFTY-FOUR OWNERS, BEFORE RE-ARRANGEMENT

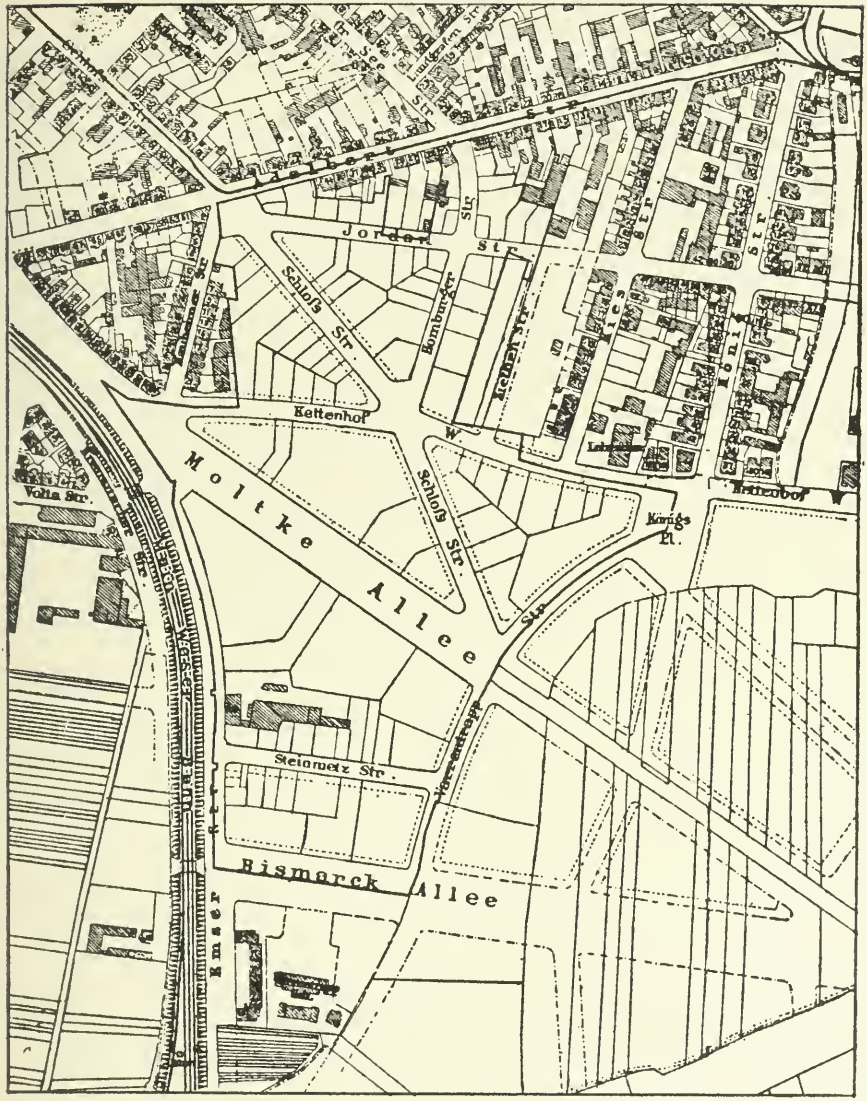


FIG. 6.—THE SAME ESTATE AFTER RE-ARRANGEMENT

cent. only of a site in outlying districts to be covered by buildings, 17 per cent. by the street, 13 per cent. by the back gardens and 50 per cent. by the front gardens.

Mannheim follows the same general policy as Ulm, but does not deal as extensively in land. To prevent overcrowding it divides the town into three zones, in the first of which 60 per cent. of the land may be covered by buildings, space between buildings is not required, and the buildings may be five storeys high. In the second zone 50 per cent. of the land may be covered, space is required between buildings, except in main streets, and four storeys is the limit. In the third, 40 per cent. of the land may be covered, space is required between all houses, except with a special permit, and three storeys is the limit. Factories are restricted to special districts.

In Frankfort,[1] owing to the enormous development of traffic within recent years and to the increase in the size of the city and outlying districts, the municipal authorities have felt it incumbent upon them to prepare a comprehensive plan for future extension, providing, as far as main highways and tramway routes are concerned, for the future of outlying suburbs and villages. The law governing building operations gives power for the compulsory readjustment of boundaries. Readjustments may be

[1] See "A Guide to Some of the Public Works of Frankfort on the Maine," a quarto pamphlet published by the City Engineer's Department, Frankfort, 1907, English edition.

undertaken either on the initiative of the authorities or by the request of persons owning more than half the total area of the land in question. In cases where this excellent rule is applied to land not previously built upon, the area required for streets and open spaces is first deducted and the remainder is divided among the owners, in building plots of suitable form, as far as possible on the sites where their property was formerly situated. Much of the land is owned in long strips which are taken over by the municipality, laid out, and redivided *pro rata*. As at Mannheim, there are three districts, in the first of which 75 per cent. of the land may be covered, and the buildings may be five storeys high, but not over 65 feet. In the second, the buildings may be four storeys high, but not higher than the width of the street. In the third, two storeys is the limit, but not higher than the width of the street. Factories are not allowed in residential districts.

The wave of city improvement is making itself felt in far distant quarters of the world, in Tokio, Rio Janeiro and Buenos Aires, and even in the Transvaal and Orange River Colony, where the most drastic and up-to-date regulations are enforced in the public interest in connection with the planning of any new town.

Having thus briefly reviewed the progress made in America, France, and Germany, England may well consider whether she is not behindhand in these questions of town extension and its municipal con-

trol, and whether the time has not arrived for taking active measures. We are too apt to wait until the last moment before making our civic improvements, and then be surprised because they are so costly. These problems are largely a matter of time, and if authorities would only look a few years in advance it would be quite possible gradually to transform the character of their towns without incurring any serious expense. If they are unable to foresee the result of their schemes for more than twenty years hence, they ought not to be entrusted with the control of such important affairs.

The motley collection of municipalities and councils to which the local government of London and Greater London is entrusted cannot possibly deal with any comprehensive scheme for the whole of the area involved, and, moreover, separate local authorities are proverbially jealous of each other. It is most important that some comprehensive plan of street and road improvement should be drawn up. "It stands to reason," says the Royal Commission on London Traffic, "that any plans, however skilfully devised, which aim at taking effect over a long period of time may in some degree require modification in the light of experience, or owing to changes of conditions: the point is to secure that in future new streets shall be constructed and improvements in old streets shall be effected, not haphazard and piecemeal as hitherto, but in relation to the general needs, and in pursuance so far as possible of a fixed policy, which should be

followed with persistent effort over a great length of time."

London has become so vast that any complete scheme for dealing with the suburbs as a whole will take many years to carry out, but this is not the case with the large cities and towns of the provinces, which are, in many cases, just ripe for such improvement schemes, and it is not too late for them to recover from the effects of bad town planning of the past.

The chief objection that is usually raised to such schemes is that they afford information which leads to unhealthy land speculation and gives a fictitious and inflated value to properties that would have to be acquired for the proposed improvements. The objection is certainly a very real one, and cannot be disregarded, but steps can doubtless be taken to meet it, and the objection should hardly be held to outweigh the advantage which would certainly result in the formation of comprehensive schemes of improvement. It should be possible to establish first a Ministry of Fine Arts to deal with all the greater and more national questions, and, secondly, to form in the larger cities strong commissions capable of dealing with all questions of improvement and future development. Such a committee has recently been created by President Roosevelt, as the direct outcome of unceasing agitation on the part of the American Institute of Architects to bring about the appointment of a body of experts to exercise control over the

design of public buildings, the location and erection of public monuments, the laying out of open spaces, street improvements, &c. The council is composed of twenty-one architects, four painters, four sculptors and one landscape architect. The President's order provides that before any plans are formulated for any public building or grounds, or for the location or erection of any statues, the matter must be submitted to the Council of Fine Arts and their advice followed, unless for good and sufficient reasons the President directs otherwise. The order directs "the heads of executive departments, bureaus, and commissions to govern themselves accordingly."

The idea of a permanent consultative body in England to whom questions of public improvements might be referred and questions of civic improvement submitted, not necessarily for sanction, but for consultation and advice, was strongly urged by Sir Aston Webb in his Presidential Address to the Royal Institute of British Architects in 1903. "The work," he said, "could hardly be entrusted to any single individual, but there would surely be no difficulty in finding men of skill, taste, and authority enough, and with patriotism enough, to form such a Commission as that established in New York, and on the same terms, if asked to do so by his Majesty's Government." It has also been suggested that the First Commissioner of Works should act as a Minister of Fine Arts—possessing the necessary despotic powers to see the right proposals adopted—and this idea has found a

powerful advocate in the Earl of Plymouth, who, it will be remembered, held the office of First Commissioner of Works and Public Buildings in the late Government, and whose views upon the question are worth quoting. In an article to the *Tribune*, January, 1906, he writes :—

"There is, no doubt, much to be said for the sweeping change that would be brought about by the creation of a Minister of Fine Arts, the most important, perhaps, being the co-ordination of matters, generally of an artistic character, which are now controlled by various departments, under one head. But before this were done, the most careful consideration would have to be given to the powers with which this new Minister and his department were to be invested ; and to transfer the control of matters hitherto successfully performed by various bodies to a new and untried department could not be done hurriedly or with a light heart.

"Seeing, therefore, little prospect of such a Minister being appointed in the near future, I think that much good might be done, or, to put it conversely, much harm might be averted, by proceeding on the lines suggested by Sir Aston Webb and by establishing some permanent advisory committee to which, in the first place, the Government might refer matters touching the creation or improvement of public buildings and national monuments under their control.

"If such a committee were properly constituted, its authority would very soon be recognised, and it

might then be possible to give it wider influence and to deal, without unduly trespassing on the individual rights of private persons, with other than Government buildings—at least in certain defined positions where the style and character of an elevation were considered of supreme importance."

A Bill passed by the Connecticut Legislature in 1907 established such a permanent Commission on the City Plan for the city of Hartford, and conferred upon it very broad powers. The Commission is composed of "the Mayor, who shall be its presiding officer, the president of the Board of Street Commissioners, the president of the Board of Park Commissioners, the City Engineer, two citizens, neither of whom shall hold any other office in said city government, one member of the Board of Aldermen, and one member of the Common Council," the two latter being appointed by their respective Boards and the two "citizens" by the Mayor. It is required that "all questions concerning the location of any public building, esplanade, street, square, or park shall be referred to the Commission" by the Common Council for "consideration and report before final action is taken on such location." Other matters "may" be referred to the Commission, the Council may delegate to it such powers as the Council deems necessary, and the city, acting through the Commission, may condemn and take any amount of property within its boundaries. Such land as is not needed for the improvements, after they have been completed, the city

may re-sell, "with or without reservations concerning future use and occupation of such real estate so as to protect public works and improvements and their environs, and to preserve the view, appearance, light, air, and usefulness of such public works." The Commissioners serve without pay, but their expenses are to be defrayed and they may employ expert advice.

Experience shows that in England municipal bodies are often only too anxious to do the right and proper thing as soon as they have ascertained what that may be, and this being so, it seems strange indeed that they should be so reluctant to make use of the advice of those artists, architects, and sculptors amongst their citizens, who naturally take great pride in their immediate surroundings. Artists, as a rule, are not the sort of men who are willing to face the ordeal of an election campaign, which is, perhaps, not altogether an unmixed joy, and it is not likely that they would be sufficiently popular with the general public to be elected as municipal councillors, but they might be co-opted on to these bodies. They could so often be of assistance in indicating the best method of procedure in questions of taste, and act as intermediaries between the Council on the one hand and the artists employed on the other.

The medical and legal professions have never shown themselves behindhand in offering their services without fee when matters of public benefit have been in question, and there can be no doubt that the

foremost artists in all branches of art in this country would readily give their services if called upon to do so.

It is most important that everywhere a local interest in the larger aspects of street architecture should be stimulated, and this can best be done by the formation of committees in all our leading cities, such as that we have already referred to at Hartford. Such committees should, in the first place, be not too large, and their duties would be to help to instruct public opinion and arouse its interest, and, also, to guide municipalities in suggesting the lines upon which improvements should be planned. With regard to London, the suggestion has been made that such a scheme for the expansion and advancement of improvements might be prepared by the Royal Institute of British Architects, working with the co-operation of kindred Societies, such as the Royal Academy, the Society of Arts, &c. Sir Aston Webb said recently, "I believe it would be possible, with the hearty co-operation of members of these societies, to produce a scheme which would compel attention and ensure, at any rate, that the alterations and expansion of London in the future shall proceed on some definite and recognised scheme." The expenses of such schemes are not heavy, being chiefly laid out in the draughtsman's fees and printing, &c., as all the artists and architects work gratuitously until the scheme is carried into execution.

The interest in tracing out the development of

a city's plan is surely one that it would be well to foster. A complete collection, for example, of the plans of any large city would be of the greatest interest to the citizens, and of quite sufficient importance to be undertaken by the civic authorities.

In London, the London Topographical Society has done excellent work in tracing out and preserving as far as possible the past history of this largest city in the world, by illustrating old remains of historic buildings about to be destroyed, and by the publication of interesting and rare maps and drawings. But it is hardly to our credit that such work should be left to private societies, and much more might be done if the authorities would combine to bring under one roof the valuable material stored away in the Crace collection at the British Museum, the Guildhall Library, and elsewhere. These collections are at present too scattered, and to be of great interest they should be brought together in one central Topographical Museum, controlled by the civic authorities. In the Rathaus at Vienna large galleries are devoted to the illustration of the evolution of the city from the Middle Ages to the present day. The National Museum at Munich and the Carnavalet Museum at Paris have most interesting topographical collections, and set an example which should be followed in every important city.

It would also be of interest if the authorities would publish portfolios of the rarer maps and plans showing the cities' development, and as a model,

nothing could be finer than the magnificent atlas of reproductions of the Plans of Paris which has been published by the Municipality, and which constitutes a most valuable record of progress from the earliest Roman times to the present day.

CHAPTER II

TYPES OF ANCIENT AND MODERN TOWNS

BEFORE considering the various types of ancient and modern cities, it will be interesting to endeavour to distinguish clearly the causes which have determined their origin and growth. In the majority of cases, a city owes its origin and success to accidents of place and commercial requirement. With perhaps few exceptions, its foundation has really been quite accidental, and the selection of the earliest sites is generally found to be due to the necessity of establishing either a military or a trading post. It follows, therefore, that these cities have been placed either in localities that were primarily well suited for defence, or on the natural highways of commerce, whether inland on streams, on the shores of a lake, or on the coast line. They have generally been preceded by military roads or common tracks, and their development has been along the lines of least natural resistance, at distances apart regulated principally for convenience' sake at the space of a

day's march. From the very earliest times, and even in countries where the population was extremely small and scattered, it has been customary for several tribes to share a common trysting-place where they held their councils, bartered goods in common markets, and met together for the observance of religious rites at regular intervals.

Although the trade carried on at these meeting-places was generally the first and most powerful motive to their institution, the love of social intercourse and the necessity for combination against a common foe added further strong incentives. Moreover, the sites of great cities have often been indicated by some nascent industry. A vein of metal or perhaps a mine, a bed of flint for cutting or polishing weapons, or a layer of clay useful in the making of household utensils, have all been attractions to draw mankind together, and if at the same time the site chosen happened to be well placed by nature for trade routes, it at once possessed all the elementary requirements necessary for the formation of a town.

Other strong influences that fixed a centre of population were those of religion and of war. The action of a volcano emitting clouds of fire and smoke, of a mighty underground river issuing from a cave in the bowels of the earth, a peculiar natural formation of mountain or rock, strange sounds proceeding from unusual natural causes — these and similar phenomena were easily sufficient to arouse in mankind the fear of the unknown and the terror of

mystery. Religion consecrates the spot, temples arise above it, the faithful make pilgrimages, and we have in time a Mecca or a Jerusalem. But probably the greatest of all influences is that of war and the need for defence against a common foe. There are still vast regions in Africa and Asia where every village is strongly fortified with breastwork and palisade; even in Europe, especially in the South, modern civilisation has not yet swept away all vestige of fortifications erected to keep out the barbarians of the African coast, and we find that nearly every group of dwellings round the northern coasts of the Mediterranean has its fortified walls and watch-towers. An island separated from the mainland by a narrow channel of deep water, like Ortygia, afforded an admirable site for a maritime city, and impregnable precipitous positions, like Taormina, from whence the defenders might hurl great stones upon the assailants, formed a sort of natural fortress that was much appreciated.

In an interesting article on the "Evolution of Cities"[1] the writer indicates the causes that generally led to the development of cities. "Primitive man," he says, "looked out the site; civilised man founded and built the city. At the earliest beginnings of written history among the Chaldæans and the Egyptians, on the borders of the Euphrates and the Nile, the city had long existed, and it appears by that time to have numbered its inhabitants by tens and hundreds of

[1] The *Contemporary Review*, February, 1895, "The Evolution of Cities," by Elisée Reclus.

thousands. The cultivation of these river-valleys required an immense amount of organised labour, the draining of swamps, the deflecting of river beds, the construction of embankments, the digging of canals for irrigation; and the completion of these works necessitated the building of cities in the immediate neighbourhood of the stream, on an artificial platform of beaten earth raised well above the level of inundation." The unevenness of the land as well as the poverty of the soil tends to repel population, and prevents, or at least retards, the growth of cities, and the natural tendency of towns, therefore, is to cluster immediately outside the forbidden area of the mountain range, retaining only a few scattered hamlets, as trading posts or halting-places, in the more sheltered valleys. "Every torrent," says Elisée Reclus, "has its riverside town in the lowland, just where its bed suddenly widens and it breaks into a multitude of branches among the gravels. In the same way every double, treble, or quadruple confluent of the valley has its important town, so much the more considerable, other things being equal, as the branches of the delta carry a greater abundance of water. Take for instance, from this point of view, the geography of the Pyrenees and the Alps. Could any situation be more naturally indicated than that of Saragossa, placed on the mid-course of the Ebro, at the crossing of the double valley of the Gallego and the Huerva? The city of Toulouse, again, the metropolis of Southern France, stands on a spot which a child might have pointed

out beforehand as a natural site, just where the river becomes navigable below the confluence of the Upper Garonne, the Ariège and the Hers. At the opposite corners of Switzerland, Basle and Geneva stand at the great cross-roads followed by the ancient migrations of peoples; and on the southern slope of the Alps every valley without exception has its warden town at its gates."

A city built against a steep hillside can hardly fail to be picturesque, especially if it rises from a river or on the sea coast; and even when owing to climate, material, soil or other local cause, the charm of colour may be absent, beauty at least of outline will not be wanting. Such a city calls for an amphitheatrical style of laying out, such as we see in Constantinople, Trieste, and Genoa. Steep hillsides can influence the division of a town more decidedly than a river. Edinburgh and Salzburg are examples of this. Many towns thus situated are divided into upper and lower towns, as at Bergamo. Though to a certain extent they may be inconvenient to traffic, hills add much to the picturesqueness of a city, and, as in the case of Rome and Paris, give it much of its character.

There are several reasons why river-banks should be so generally chosen as town sites. The never ceasing movement of the current, besides its value from hygienic reasons, is a most important commercial asset both as a motive force and for purposes of transport.

The sites of both London and Paris were determined by the advantages offered for fording the

Thames and the Seine. In the case of London it was not possible to cross the river near the mouth owing to its depth, but near where the Abbey of Westminster now stands the river spread its course over many miles of marshes, and when the tide went out it became comparatively easy to cross on foot. The early Britons established their Lake fort or Lyndyn, on a hill rising about 60 feet above the sea level

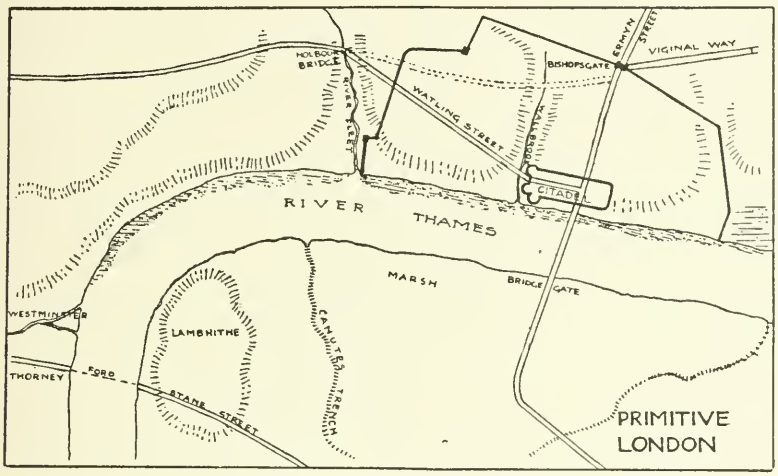


FIG. 7

near the spot where now stands St. Paul's Cathedral. To the east and west it was protected by two small rivers, the Walbrook and the Fleet, and behind it the marshes of Finsbury guarded against attack from the north. In front, the broad lagoon of the Thames estuary, with steep clay banks, served both as a highway for commerce and also as a defence. On the arrival of the Romans they found London a flourishing trade centre. They fortified the hill on the east side

of the Walbrook and erected a walled citadel. Paris first appears in history as a little cluster of huts upon a group of islands in the Seine, near the point where the waters of many branches converge in the main stream; the land around was for the most part flat and marshy. The position was probably chosen entirely on account of its defensibility. The surrounding country was not unprepossessing—a shallow basin with

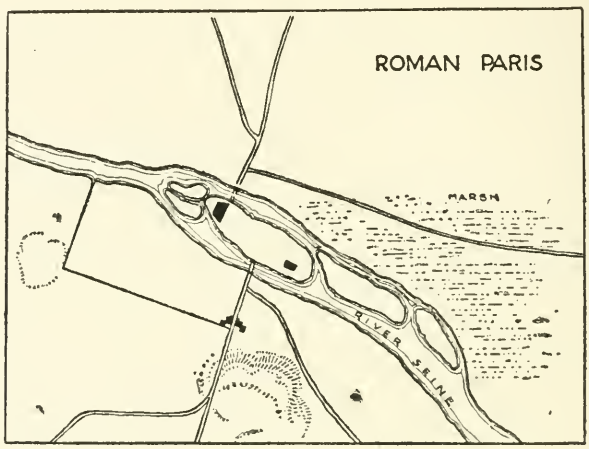


FIG. 8

a quiet river winding through and surrounded by a circle of low limestone hills. "The boatmen of the Seine, Cæsar's *Parisii*, found in the little group of islands a safe and convenient *entrepôt*, and during the period of Roman domination developed an interesting organisation, the *Nautæ Parisiaci*, which became in the Middle Ages the *Marchands de l'Eau* and in the end the Municipality of Paris. They left their symbolic ship on the civic seal. The cluster of islands

in the Seine was not only a convenient haven of exchange, but also gave passage to the main Gallo-Roman road, which came up from Orleans and went on to Belgium and Britain."[1]

The site chosen for the capital of a state is to a great extent factitious. The first and most important point is that it should be as far as is practicable in the centre of the state. Thus, Rome was splendidly placed about midway of the vast Empire, stretching from end to end of the Mediterranean and central with the Italian peninsula. Paris, Berlin and London are all well placed.

The early cities of the Egyptians, Assyrians, Babylonians and Persians often enclosed an area of immense extent, resembling a vast armed camp rather than the modern idea of a city. They were mostly the creation of despots who collected the dwellings of thousands of warriors round their own strongly fortified castles. Succeeding rulers frequently founded new strongholds on their succession, and the old cities, owing to the universal use of undurable material, were left to decay, and soon completely disappeared. As to the ground-plan of these ancient cities very little is known, and we must await further excavations before it will be possible to trace more than their principal temples and public buildings. The city of Babylon, according to Herodotus, consisted of an enormous square, the sides of which extended for thirteen miles; presumably this immense area was

[1] "The Topographical Transformation of Paris," by Edward R. Smith.

chiefly composed of many detached groups of houses or small towns, the intervening spaces being intended to afford shelter for the whole surrounding population with their cattle in times of war, whilst the size of the enclosure and the height of the walls rendered a hostile blockade difficult. Herodotus tells us that the streets were wide, and were lined with houses of three and four storeys. They were laid out in a rectangular form according to the points of the compass; the royal castle and the great tower were planned upon high mounds, and upon the slopes of these the famous hanging gardens were laid out. The excavations that have laid bare the foundations of Nineveh show that the city had a circumference of about eight miles, the ruins of the walls showing a height in some parts of 50 feet. The recent excavations conducted by the German Orient Society upon the site of Jericho show that the city was planned upon a large oval mound, 360 mètres long by 160 mètres wide. The space was walled in by a massive city wall, with towers projecting at apparently irregular intervals. At the northern end of the mound the citadel has been exposed; it was apparently in the form of a rectangle, with towers situated on the angles; the interior was found to be a perfect warren of small houses, threaded, as are many Eastern bazaars to-day, by a single thoroughfare, most of the houses being reached by passing through those of their neighbours.

In the foundation of Greek cities Dr. Stübben

distinguishes four distinct periods. In the first of these the city was planned only as a place of refuge against hostile attack; in the second, its chief use is in the development of trade; in the third, the artistic embellishment is the leading feature, and the fourth period embraces the time of the decline.

The earliest Hellenic towns were established in easily defensible positions upon mountain crests and hill-tops. Many places in the interior of Greece and the South of Italy and Sicily show how well such sites were chosen. With advancing civilisation, the demands of commerce could only be met by cities planned in more accessible spots, in river valleys and upon the sea coast. This was particularly the case with the colonial cities founded on all the coasts of the Mediterranean, and cities such as Syracuse, Girgenti and Selinus all testify to the marvellous power of colonisation possessed by the Greeks. History repeats itself, and hence we find that though the cities of the mother-country Athens and Corinth consisted of a maze of narrow streets without plan, the colonial pioneers determined in their own towns to promote a more reasonable architectural plan, just as in modern times the cities in America and Australia have broken away from European examples.

The city of Selinus, in the South of Sicily, was founded by the Dorians in 628 B.C., and is the earliest regularly laid out city of which we have any trace. A most fascinating restoration has been recently made by M. Jean Hulet, a *pensionnaire* of the École des

Beaux Arts. In describing the plan, as laid bare by these studies, M. Gustave Fougères says that the city, which occupied an entire peninsula, easy of defence on the land side and enclosed by two ports,

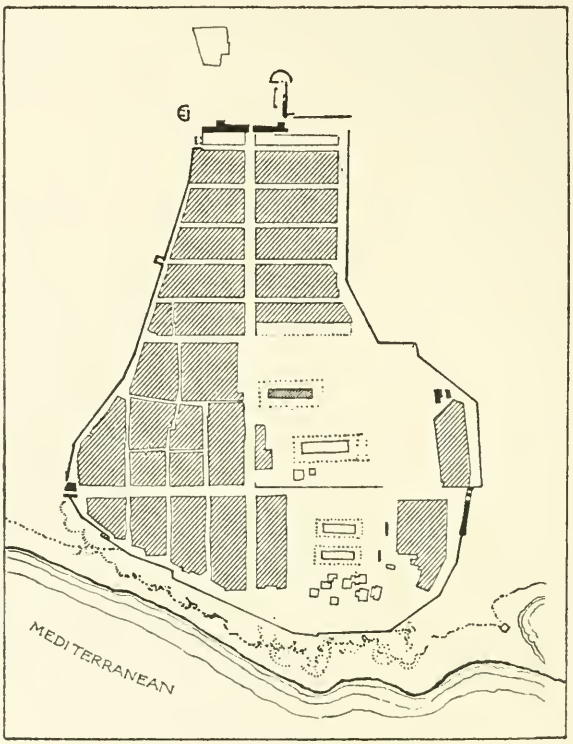


FIG. 9.—A RESTORATION OF SELINUS

was entirely fortified and "divided as to its length by a great street running straight from north to south and seven mètres wide; and as to its width by seven or eight transverse streets cutting the first at right angles, and dividing the houses into nearly equal blocks. It is the oldest example known of the

application to the lay-out of towns of the geometric principles of the architect Hippodamus of Miletus, a contemporary of Pericles and author of the plans of the Piræus, of Thurii, and of Rhodes. Hippodamus, a follower of Pythagoras, was the Greek 'Haussmann' of the fifth century B.C. Strongly imbued with the idealistic spirit of his time, he desired to substitute clear, reasoned, and scientific conceptions for the caprices of chance. He dreamed of regular and geometric cities, preferring his theoretic plans to the tortuous mazes gradually formed by force of time." At Priene, in Asia Minor, the excavations have disclosed a type of city built throughout according to these principles.

The third and highest stage of development in Greek cities was reached in the days of Pericles, who completed the fortification of Athens and the Piræus. The Agora or market-place, surrounded by halls, occupied the centre of a rectangular network of streets, theatres and temples forming the termination of their vista. The temples were placed crosswise to the direction of the streets, so that they presented a fine façade to two streets. A similar arrangement is shown in the Doric coast town of Knidos, nestling amongst hilly ground and surrounded by fortified hills, on which the temples of the protecting deities were raised. Here, as at Taormina and Syracuse, the theatre was hewn out of the solid rock in such a position that it afforded a glorious view of the sea. The same type is also distinctly shown in the inland town of Priene, in Asia

Minor, whose streets, planned upon the rectangular system, forced their way through rocks at some places, and at others had to be supported on massive buttresses. The streets were not wide, only measuring from twelve to sixteen feet, and, as befits a democratic community, the blocks of buildings were comparatively small; but

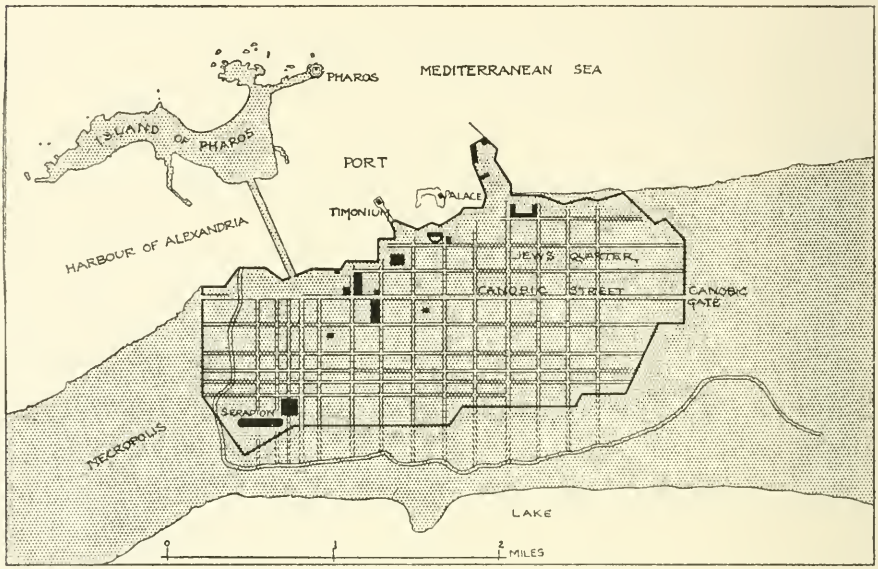


FIG. 10.—PLAN OF ANCIENT ALEXANDRIA

the Agora, as the central scene of public life, was very spacious.

Under the rule of Alexander the Great and his immediate successors, the Diadochi, many new cities were laid out. The greatest of these was Alexandria itself, founded about the year 323 B.C., from the designs of Dinocrates, the foremost architect of the day. Its fine harbour and other local recom-

mendations rendered it a convenient spot for the site of a commercial city, and the commanding position on the Mediterranean could not fail to strike a great administrator. It promised to unite Europe, Arabia, and India, to be the rival and successor of Tyre, and to become the emporium of the world. Its plan consisted of a series of parallelograms; all the streets were at right angles to each other and two main thoroughfares bisected the city in opposite directions. According to Strabo, these were over a hundred feet broad and ornamented along their entire length by colonnades; one of these main streets, Canobic Street, is still in use, although almost all vestiges of the ancient city have long since disappeared. The city was divided into sections, the principal of which were—(1) the Regia or royal enclosure, walled in and occupying a fourth part of the city, containing the royal palaces and public buildings; (2) the Rakôtis, chiefly inhabited by Egyptians; (3) the Jews' quarter; (4) the Nekropolis, or city of the dead, to the extreme west of the city, and (5) the Nikopolis, east of the Canobic Gate, which was practically a suburb of Alexandria. The area of the city, with its three suburbs, is said to have equalled fifteen square miles.

The Romans, in laying out their cities, proved themselves to be eminently shrewd and practical engineers. They always well considered their site, both on account of its adaptability from the military point of view and also from the facilities afforded for commerce, traffic, water supply, and drainage.

The model for all their new cities originated in the *castra*, or camp, divided at right angles by streets leading to the four gates. In the older towns, such as Pompeii, that had been slowly developed, there is no attempt to lay out the streets in a regular way. Pompeii is an example of a city to which considerable addition had been made from time to time. It is built in the form of an irregular ellipse extending from east to west; the circumference of the walls amounts to 2,843 yards and there are eight city gates. Officially the town was divided into nine regions by the four principal streets connecting the gates: the Cardo (central axis) and another parallel street not yet excavated, running from north to south, and the Decumanus Major and Decumanus Minor (major and minor transverse line), running from east to west. Each region is subdivided into *insulæ*, or blocks of houses, bounded by four streets. The streets, bordered by pavements, are seldom above 25 feet in breadth and the narrower lanes only 14 feet.

The directions given by Vitruvius help us to form some idea of the care and consideration which the Romans applied to the laying out of their new cities. Vitruvius is an eminently practical writer in all that he suggests, and if a town had been laid out according to his rules, it would certainly have fulfilled the most exacting demands of hygiene and of commerce. "In setting out the walls of a city," he says,[1] "the choice of a healthy situation is of the first importance: it should be on high ground, subject neither to fogs nor

[1] Book i., chapter iv., Joseph Gwilt's translation.

rains; its aspects should be neither violently hot nor intensely cold, but temperate in both respects. . . . A city on the seaside, exposed to south or west, will be insalubrious; for in summer mornings a city thus placed would be hot, at noon it would be scorched. A city also with a western aspect would even at sunrise be warm, at noon hot, and in the evening of a burning temperature." He mentions a curious custom of the ancients, who, he says, always, after sacrifice, carefully inspected the livers of those animals "fed on the spot whereon the city was to be built, or whereon a stative encampment was intended. If the livers were diseased they tried others, in order to ascertain whether accident or disease was the cause of the imperfection: but if the greater part of the experiments proved, by the sound and healthy appearance of the livers, that the water and food of the spot were wholesome, they selected it for the garrison." Vitruvius recognises that the dangers suggested by such experiments are liable to exaggeration, and goes on to say that "when a city is built in a marshy situation near the sea-coast, with a northern, north-eastern, or eastern aspect, on a marsh whose level is higher than the shore of the sea, the site is not altogether improper; for by means of sewers the waters may be discharged into the sea; and at those times, when violently agitated by storm, the sea swells and runs up the sewers, it mixes with the water of the marsh, and prevents the generation of marshy insects." As a proof of this statement he instances the city of Salapia, in Apulia,

which was so placed that the inhabitants were continually out of health. At length they applied to Marcus Hostilius, asking him to select a more wholesome spot for the city, whereupon he bought an estate in a healthy place four miles from their old city and close to the sea, and opening a communication between the lake and the sea, he converted the former into an excellent harbour for the city. With regard to the difficulty of wind, Vitruvius says that streets are to be so set out that when the winds blow from the prevailing quarter their violence may be broken against the angles of the different divisions of the city, and thus dissipated. After these general remarks he deals with the positions best suited to the most important public buildings. The temples of the immortal gods should have such an aspect that the statue in the cell may have its face towards the west. But if the nature of the place does not permit this, the temple is to be turned as much as possible so that the greater part of the city may be seen from it. If temples be built on the banks of a river they should face the river, or if at a roadside they should be so placed that those passing by may look towards them.

In Roman cities the public squares may be generally divided into two classes, the Forum and the Market, which were planned quite apart and had seldom any connection with each other. Aristotle says that a forum should only be used as a public meeting-place and for the display of beautiful works of art, and that all slaves, artisans, and labourers should be denied

FIG. 11. THE FORUM AT POMPEII

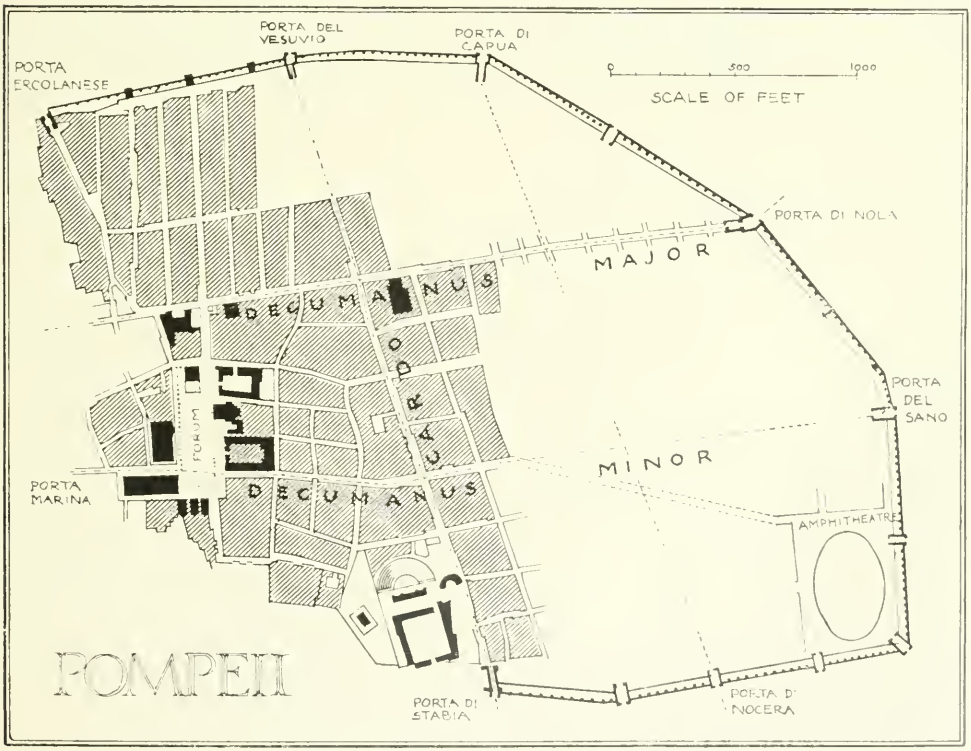


FIG. 12. PLAN OF POMPEII SHOWING THOSE PORTIONS THAT HAVE BEEN ALREADY EXCAVATED

access to it, whilst the market should be in another part of the city, and of easy access to all the means of transport both by sea and land.

In their colonial towns, and especially in their military camps, the Romans always placed the Forum at the point of intersection of the two principal axial thoroughfares. The Forum at Timgad, a military colony founded under Trajan in the North of Africa,

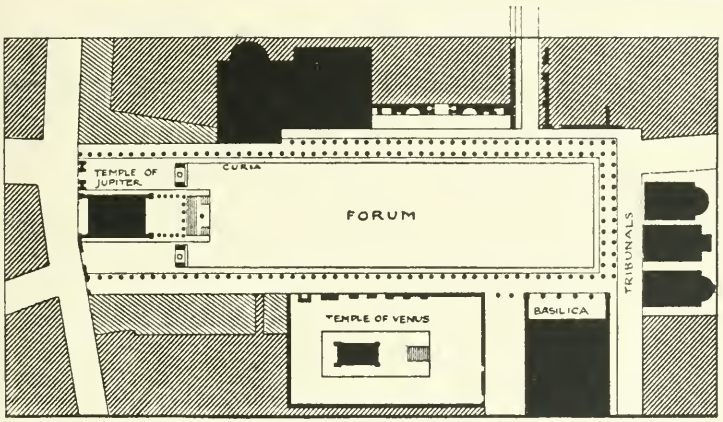


FIG. 13.—PLAN OF THE FORUM AT POMPEII

is an excellent example of the traditional type established in an entirely new colony. It is almost square in plan, entered from the principal thoroughfare by an archway very much like the large bazaars in Eastern cities. A large basilica occupies the greater part of one side, and opposite are the *curia* and a small temple. The Forum at Pompeii differs from that of Timgad in several points. Pompeii was a city remodelled by the Romans, and the Forum here belongs more to the type of Rome itself. It is domi-

nated by the Temple of Jupiter on the north side, the other sides being enclosed by colonnades.

In the social organisation of the Middle Ages great changes were made in town planning. The dwellers in the country, says Stübben, were farmers forming a class quite distinct from the citizens. The country produced the raw material, and in the town dwelt the citizens and merchants who manufactured these raw materials and negotiated the exchange of goods by import and export, the town market being used for the mutual exchange of the products. Most of the German towns have grown gradually from such country communities and have always remained small towns. No German town of the Middle Ages probably numbered more than 25,000 inhabitants.

The growth and development of the mediæval city was always very gradual; the necessity for its remodelling was generally brought about by violent methods of war rather than by the peaceful natural expansion of population. Utilitarian and ideal conditions of city building were developed side by side, and improvements were more often brought about by rulers having the ambition and the power to institute a new order of things than by the demands of public opinion. We find the direction of the streets invariably governed by the primitive topographical disposition of the different quarters of the city, and new quarters added from time to time were planned without any idea of further developing the old currents of traffic.

Mediæval towns may be divided into several classes. Some are of Roman origin, others consist of a group of streets and houses clustered round the walls of a castle or under the protection of some wealthy and important monastery. In these cases we generally find that no regular plan has been followed. There is, however, still another class of towns which were built from their foundations on a new site for some specific object, and we often find that such towns were laid out in a regular and symmetrical manner.

In cities that were of Roman origin, such as Lincoln, Chester, Colchester, &c., considerable parts of the older walls still remain ; in others they may be distinctly traced, but in all these towns the plan seems to have been the same ; a parallelogram with a gate in the centre of each side and the principal streets carried through in straight lines, as we have already seen in the plan of Pompeii. The regularity of the town ended in its main streets, and no attempt was made to regulate the various quarters or districts, where the houses were crowded together regardless of all symmetry.

In another class of mediæval town the key to the whole plan was the castle or fortress, with its church and monastery in close proximity—a town essentially planned for defence, its walls pierced with as few points for egress as possible. The more important buildings were collected towards the centre of the city and the public spaces grouped round them, an inner ring of broader streets enclosing the market space, from

whence the main thoroughfares radiated to the city gates. In such a town, beyond a more or less direct line being given to the main streets, no effort would be made to lay out the city upon any regular system, and each person built according to his convenience, or as he gained permission. As far as possible the side streets branched off from the thoroughfares at right angles. The principal thoroughfares, old and new, that formed the backbone of the town, often following the lines of demolished walls, have left a distinct ring, as at Antwerp and Paris. The principal streets were about 24 feet wide, the lanes 18 feet, and the passages 6 feet. In larger towns the principal streets were sometimes 30 feet in width. This ring line can be distinctly traced in many towns. Nüremberg, for example, planned upon both sides of the river, was enlarged on several occasions. From a cluster of houses round the imperial castle erected in the eleventh century, the city extended beyond its first encircling wall, until, towards the middle of the thirteenth century, a new wall had to be built to enclose all the settlements. In many cities we find one ring added after another ; these are not always distinctly expressed, but well defined examples may be found in the plans of Coblenz, Cologne, Antwerp, Vienna, and Paris.

"In the latter part of the Middle Ages," says Stübben, "when towns entered upon a period of greater prosperity, the public places and streets were beautified and transformed by the reconstruction of

churches, town halls, markets and guildhalls, while the places were enlarged and adorned with fountains. A feeling of opulence possessed the citizens, whose guilds vied with each other in the artistic development of the city, thus imparting an individuality which is the great charm of the mediæval city."

Some writers would have us believe that the mediæval mind strove after all irregularity to such an extent that it deliberately chose to lay out towns in as unconventional a manner as possible. Although in the buildings themselves attempts were rarely made to produce a symmetrical or regular effect, where we find examples of cities entirely planned upon a new site they are sometimes more regular and symmetrical than the most modern towns.

In the thirteenth century no less than 50 towns were founded by the English in Aquitaine and Guienne within the same number of years, all of which were laid out, wherever practicable, upon a definite system, and formed an essential part of the wise and farsighted policy of Edward I. He endowed them with special privileges to encourage inhabitants to flock to them, and in this he appears to have been very successful. The inhabitants were all made free men, exempt from the power and jurisdiction of the neighbouring barons and bishops, and their tenure was direct from the crown. In 1298 Edward I. wrote from Bordeaux to London, desiring the authorities to send him four persons competent to lay out the plans of towns. "The most able and clever, and those who

best know how to divide, order, and arrange a new town in the manner that will be most beneficial to us and to the merchants."

These towns were regular and symmetrical ; the streets were wide, open, and straight, crossing each other at right angles only ; between the principal streets and also in parallel lines were narrow streets or lanes corresponding to the modern mews and employed

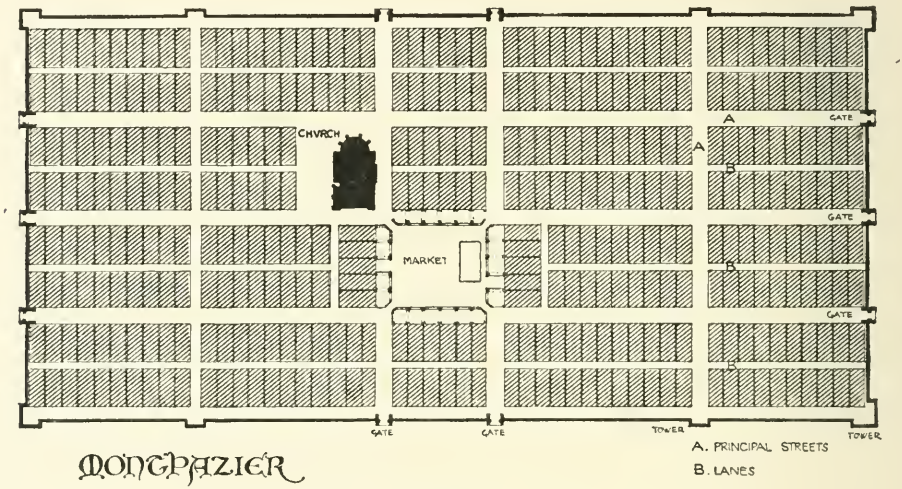


FIG. 14

for the same purpose : by this means each plot of ground for building was of a uniform size and shape, a parallelogram with one end facing a principal street and another a lane. In some towns each building plot, or, when built upon, each house, was also divided by a narrow passage or court, leading from the principal street to the lane, serving as a watercourse and surface drain. The principal streets were 24 feet wide, the lanes 16 feet and the passages only 6 feet.

The chief advantages of these passages was that in case of fire, each house being detached from its neighbours, the flames could be more easily extinguished.

Near the centre of the town was a large market-place, at one corner of which stood the church. The principal streets were so planned that they ran in a line with the four sides of the place, passing out from each corner in a direct line to the town gates, so that the traffic did not interfere with the central space.

The most perfect example of these English towns of Edward I. is Montpazier, founded in 1284 in the department of Dordogne, Aquitaine. Here the central market-place is surrounded by arcades forming a sort of covered way, and there are ten principal gates to which the main thoroughfares lead ; Libourne, Sauveterre, Monsegar, La Linde and Samite Foy were all towns built by Edward I. upon the same regular plan, the walls forming a parallelogram and having a central market-place surrounded by arcades.

The best example in England of these mediæval towns laid out on a regular plan is Winchelsea, which was founded by Edward I. on a new site in consequence of the encroachment of the sea having almost destroyed the old town. Owing to the irregular form of the ground to be built upon, a ridge of high land between the river and the sea, the plan of the town is not so symmetrical as the French examples. In 1277, John Kirkeby, Bishop of Ely and Treasurer of England, was sent by the King to make a report and to lay out a new town. His plans were much more

grandiose than the result justified. They evidently contemplated and prepared for a large and important seaport town, though from circumstances that were not foreseen this was never finished. The new town was twice sacked in the early part of the fourteenth century, before it was half finished, and appears never to have recovered from these repeated misfortunes. The distance from the Land Gate to the New Gate is

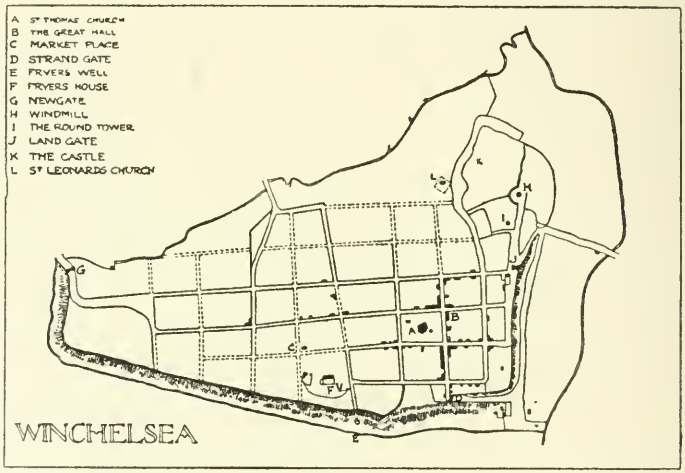


FIG. 15

nearly a mile. On the west side, where not protected by the natural form of the ground, there is a very deep ditch with a mound, but on the other side the natural cliff was considered sufficient protection.[1]

Towns situated upon navigable rivers usually expand in a direction parallel to the river, and the

[1] For other information on the mediæval town in England see Hudson Turner and Parker's "Domestic Architecture of the Middle Ages."

principal thoroughfares run in the same direction, a fact which is due no doubt to the land sloping towards the river. We see examples of this in London, where from the earliest times the Strand and other main thoroughfares ran parallel to the Thames. Early settlements often consist of a series of such parallel streets joined at intervals by secondary streets, and

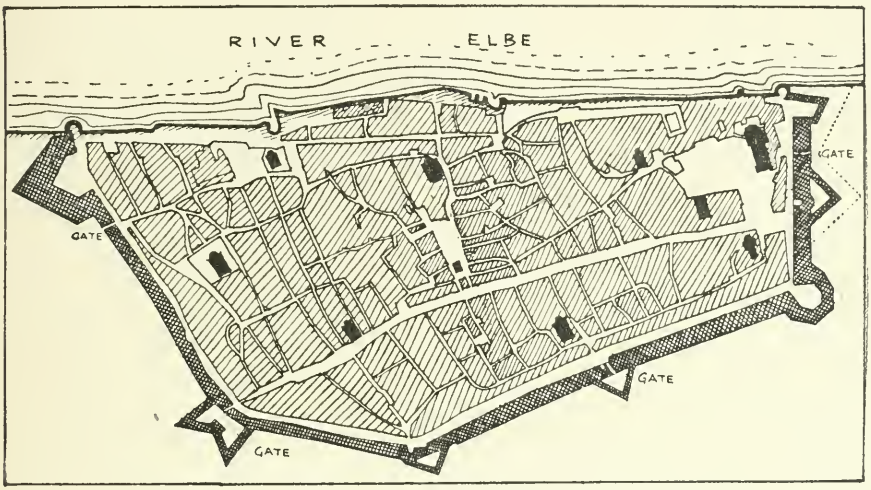


FIG. 16.—MAGDEBURG ON THE ELBE, AS EXISTING IN 1632

it is not until the river becomes spanned by a bridge that the radial lines of thoroughfares begin to assert themselves. As the town increases in importance, fortifications become necessary, and a close ring of walls is built in horseshoe form from one point on the river to another, with strongly fortified towers at both the points where the fortification joins the river, as shown in the plan of Magdeburg (Fig. 16). Such a form of city plan allowed of very little

expansion, for, the walls once having been solidly built, it rarely happened that they were taken down again, and it was not before a city had been reduced by its enemies that any enlargement was seriously considered.

In course of years these fortifications became the sites of "rings," as in the case of Vienna, and in this manner towns often developed radially, the main thoroughfares converging on a series of points indicated by the sites of the city gates, instead of in the natural way, that is, parallel to the river. In such instances the ring form has many disadvantages, as it certainly does not conform to the traffic requirements if the river is used to any great extent, and the better arrangement, where the site is sufficiently level, is that which was adopted at Amsterdam of transforming the fortifications into a ring of navigable canals. It is rather extraordinary that such an opportunity of immensely increasing the transport facilities which a river affords should have so rarely been taken advantage of. Both at Buda-Pesth and Bremen schemes for such inland waterways were prepared, but in neither case were they carried out. Breslau, on the Oder, has a large navigable waterway surrounding the city on the site of the old fortifications, which, if the plans for its completion are eventually carried out, will materially advance its prosperity.

Whenever the opportunity has occurred in modern times of planning a new city upon the banks of a navigable stream, we find the same tendency to develop

upon lines parallel to the stream, instead of away from it, as, for example, at Chicago and New York.

As we have already shown, the rectangular type of town plan was much used during the Middle Ages.

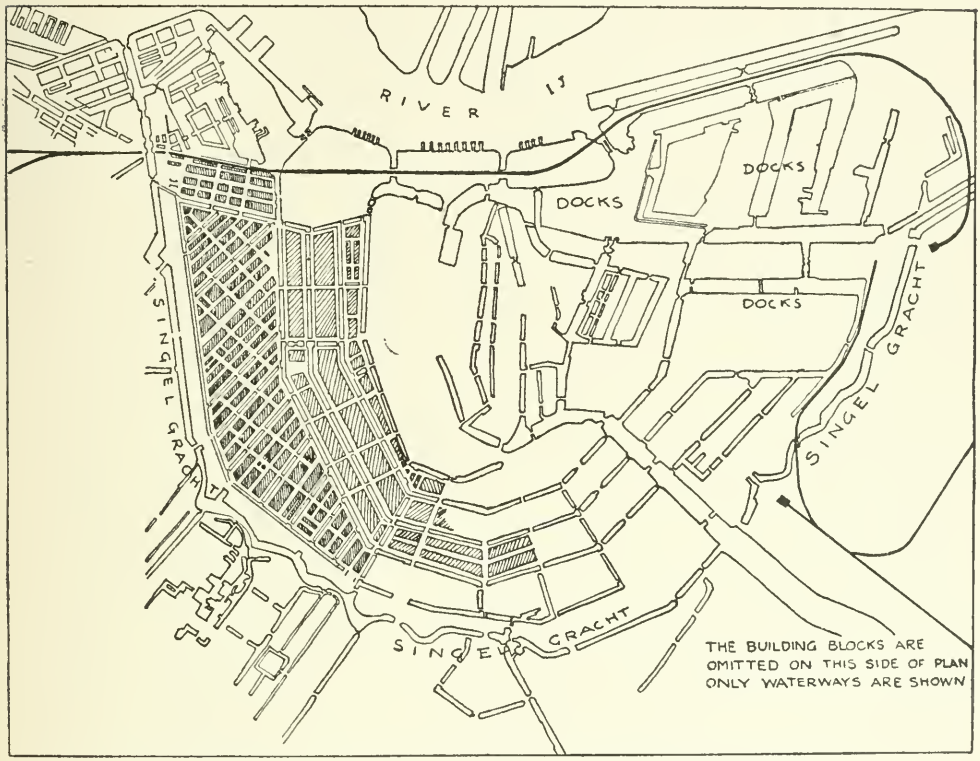


FIG. 17.—PLAN OF AMSTERDAM, SHOWING THE SYSTEM OF WATERWAYS

With the revival of classical styles it was found to be better suited to the needs of the day, and the symmetry of classical façades forced the town plan to greater regularity. In the sixteenth century Italian towns vied with one another in straightening and widening their streets, in laying out their public places, and

in replacing the mediæval alley by well-paved, broad streets. Leon Batt. Alberti, in his writings, says that although, for important streets, straight lines might be more majestic, yet for streets of secondary importance curved lines were to be preferred, both on æsthetic and practical grounds; but his advice was apparently little heeded. Rome underwent a complete rebuilding in the sixteenth century, and the Piazza del Popolo, the Via Sistina, the Piazza di Spagna and Trinità de' Monti, the Capitol, and Bernini's forecourt to St. Peter's are all examples of town planning in the "grand manner" dating from this and the succeeding century.

From Italy the grand manner in city planning spread to France, where, towards the end of the sixteenth century, we find Bernard Palissy writing a treatise on the laying out of a model city, in which he advocates that every part should be planned squarely and regularly.

When Europe once more settled down peacefully after the Thirty Years' War, the founding of towns became a favourite occupation among princes, and mostly originated in connection with the building of palaces. Amongst such may be mentioned Berlin, Mannheim, Karlsruhe, Cassel, Düsseldorf and Coblenz. A city laid out by Cardinal Richelieu was conceived upon similar lines. In 1703 Peter the Great founded St. Petersburg at the nearest point to the sea then available in Russia. The city was laid out upon a definite plan and completed within the space of a

few years, in spite of great difficulties of site and climate.

Cities laid out upon preconceived plans may be broadly divided into three classes or types :—

1. The spider's-web, or radial system.
2. The rectangular, or chessboard.
3. A combination of the two classes.

The radiating is the type which has been most generally followed in Europe, chiefly because it is more adaptable where new quarters have to be added to an old city. The second type, which is the more ancient of the two, has been almost invariably chosen in laying out cities in America and in new colonies generally, where æsthetic requirements have rarely been considered. It will not be difficult to show that, both as affording greater traffic facilities and from the æsthetic point of view, the radial has proved in the past to be the better system; and in the United States there has recently been a tendency to recognise the mistakes made in former days and, where possible, to revert to the radial system, though this can now only be achieved at vast expense unless there happen to be many opportunities of utilising public open spaces.

The radiating type is exemplified by New Orleans in America and Karlsruhe in Europe. Karlsruhe (Fig. 18), the capital of the Grand Duchy of Baden, owes its origin to the Margrave Charles William of Baden Durlach, who transferred his residence hither from Durlach in 1715. The streets radiating in the form

of a vast fan, form a central ring round the palace towards the south-west, south and south-east, the northern half being occupied by the immense gardens and park of the palace. At Karlsruhe the radial system has been absurdly exaggerated and misapplied, the grave defect being that the centre of the whole scheme is the royal castle, which, of course, is not the centre of circulation;

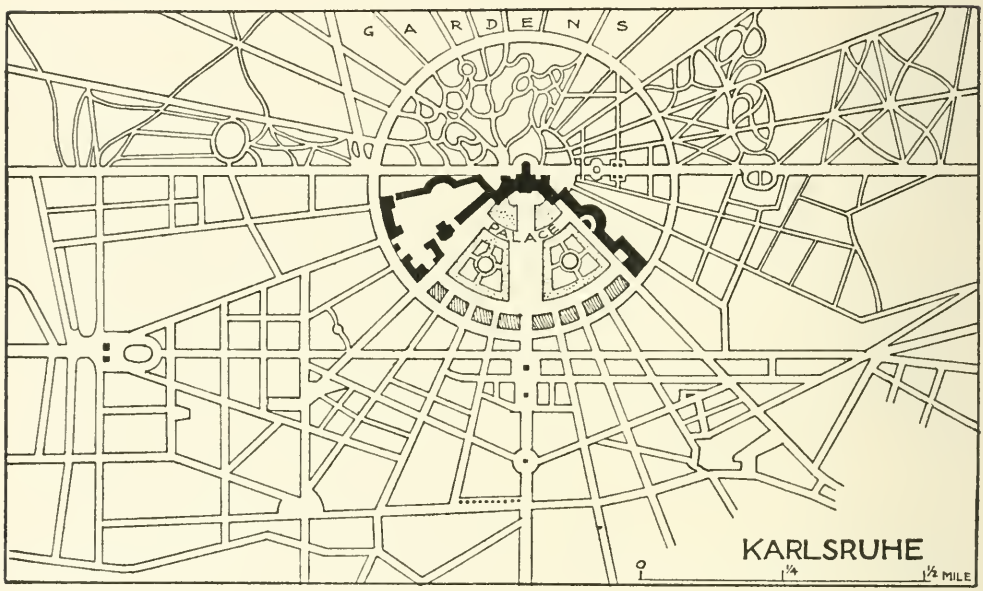


FIG. 18

moreover, the streets are laid out in such a way that the spectator can never escape from a view of the central dome of the castle. The plan of New Orleans (Fig. 19) owes its fan-like shape more to accident than design. The old city at the bend of the river was laid out by Bienville. As the city grew, the plantations above and below were gradually incorporated under the name of Fauxbourgs. The boundary lines

of the plantations ran back from the river at right angles, resulting in the peculiar fan-shaped effect in the district west of the old city. The owner of each of these plantations laid out imposing avenues down

FIG. 19

the centre, while the streets parallel to the river were planned at right angles to them.

The fan-like system and the general arrangement as exemplified at both Karlsruhe and New Orleans, although less monotonous, do not seem to be any improvement upon the chessboard system. In fact, when

these radiating streets become too multiplied, as at New Orleans, the islands that are formed become thinner and thinner, and their form of sharp sectors is neither agreeable nor convenient. In the radiating system, the principal lines of circulation, or arteries, meet at certain points known as traffic places, corresponding to the knots of a net. These points form centres for the distribution of the movement of a city. In old cities such points were frequently the market-places, and the most important one in a city was often utilised for setting up a column, from whence distances were measured, but in modern cities open market-places are no longer required, and the exigencies of circulation tend more and more to prohibit such a centralisation of streets, and to form a series of traffic places all connected by broad streets.

In cities laid out upon the radial system, the radiating streets form as it were the skeleton of the system. The plans of Rome and other ancient cities indicate a well-marked system of such thoroughfares. Next in importance to the radiating thoroughfares are the annular rings or boulevards which are so marked a feature in all continental cities, *e.g.*, the Ring-Strasse at Vienna or the Parisian boulevards. As a matter of fact, these "annular" streets, instead of being an actual ring, are made up of a series of short straight thoroughfares connecting various points, where they form intersections with the radiating thoroughfares. Such radiating and annular thoroughfares divide the city into wedge-shaped areas, which, in order that

they may be practically accessible, are again subdivided, usually into rectangular blocks. Such a system fails in that it does not provide an easy means of transit

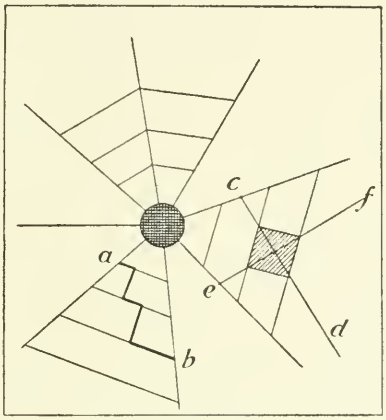


FIG. 20

in a transverse direction; for example, if one wishes to pass from point *a* to *b* (Fig. 20), it is necessary to follow the streets in zigzag form, and it is in

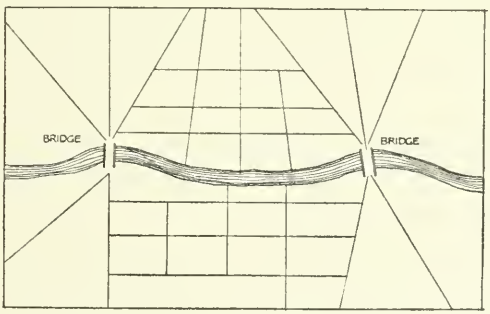


FIG. 21

correcting this mistake that modern cities have been obliged to devote so much of the money available for street improvement. The only way to rectify

such a mistake is by the construction of cross streets as at *c—d* and *e—f*. In the case of towns planned upon a river bank, like London and Paris, the radiating system seems to be the most natural one to follow, as the bridges form focal points which must govern the entire plan (see Fig. 21).

The radiating system of planning is well exemplified in the city of Bologna, where two radiating centres

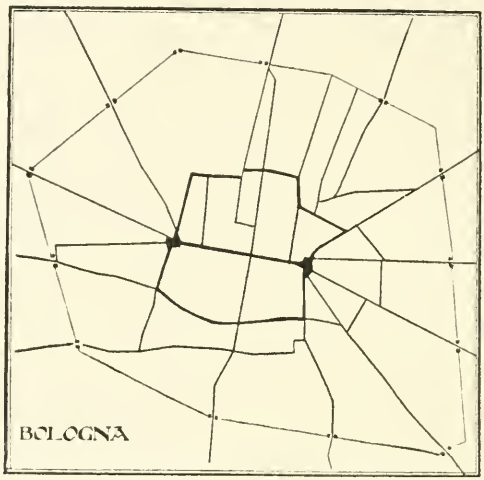


FIG. 22

are placed on opposite sides of a central rectangle forming the heart of the city.

At Amsterdam the radiating system has been applied to the waterways, which have governed the arrangement of the streets, and the city owes a great deal of its prosperity to the way in which all parts are kept in touch with the River Amstel by means of an elaborate network of waterways. The principal canal, known as the Singel Gracht, forms practically a half

circle surrounding the heart of the city, and the secondary canals penetrate into the city on all sides. The whole street system follows the lines of the canals and is dependent upon them.

The chessboard system of planning, on paper, appears to have certain advantages, owing partly to the fact that it involves a minimum of waste ground, and partly to the economy of labour resulting from right-angled construction. But it is the most unsatisfactory of all forms of street arrangement, if the convenience of the citizen be considered. It is a geometric axiom that the distance of two sides of a right angle is greater than the third, and, therefore, any system of transit through streets of right-angled plan, north or south, east or west, must necessarily increase the distance to be travelled in cases of traffic wishing to move diagonally; and the course to be travelled becomes very indirect, involving much waste of time. The rectangular city is then not perfect without diagonal streets, and diagonal streets waste the virtue of rectangular formation. When topographical accident breaks the network of streets in such a city, the streets do not deviate by a single yard. At New York, for example, opposite Ward's Island, several longitudinal avenues are interrupted by a bend in the river bank, continuing their direction on the other side as though a landslip had partly wiped them out. The system has only one merit, that of simplicity; it can only be applied to absolutely new cities and cannot in any way help us in dealing with street planning in old cities. Unsatis-

factory as the chessboard system is on level ground, on hilly country it is still worse, for it often happens that to get from point to point on about the same level, a rise may have to be ascended and descended, in addition to wasting one-third of the distance. Indeed, so steep are many of the streets in the rectangular cities of America and Australia that they are useless for horse traffic, and those that have been rendered usable have only been made so at enormous cost.

It seems strange that such a bad system as the chessboard plan should have been so universally adopted in American and our colonial cities, whether on rivers, or the seaboard, on the hills or the plains. One reason for this probably is that the early town surveyors were usually men of small experience and little artistic instinct, to whom the paramount desire would be the creation of easily surveyed plots. Thus, we often find that colonial townships where the heat is excessive are planned with such an orientation that at mid-day, when the heat is greatest, it is almost impossible to obtain shade.

The rectangular type of city has not often been adopted in Europe. We find it suggested in the sixteenth century in Bernard Palissy's description of the ideal city, and also in the city laid out by Cardinal Richelieu. In the Low Countries, where the flat nature of the site would lead us to think we might find such plans, we hardly meet with any example except at the Hague. The most conspicuous example is at Turin, where the plan of the old Roman city,

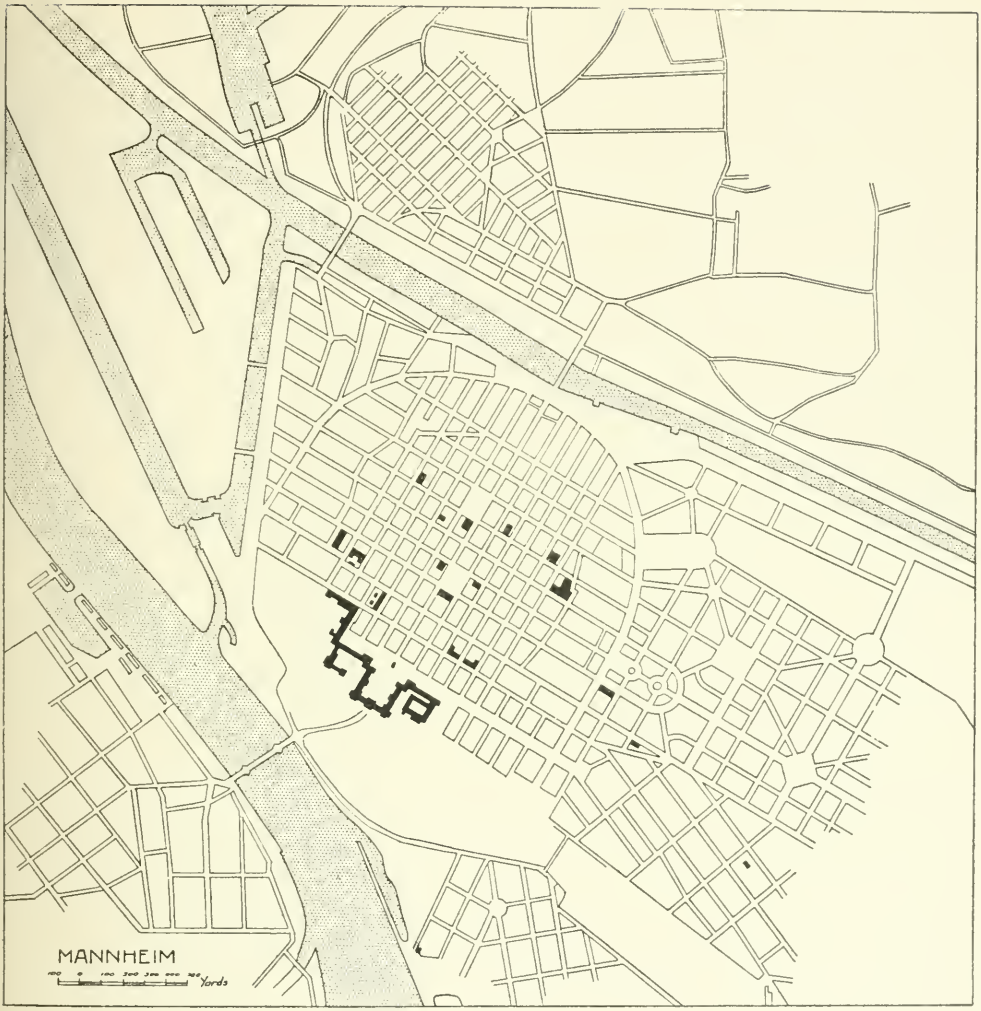


FIG. 23

founded by the Emperor Augustus, formed a rectangle 2,210 feet in length and 1,370 feet in breadth, with eleven towers on each side. In 1706 the mediæval buildings of the city were cleared away, and in 1801 the fortifications were demolished by the French and the new city was laid out upon the ancient lines, with rectangular blocks of houses known as *Isole*, long, broad, straight streets and spacious squares.

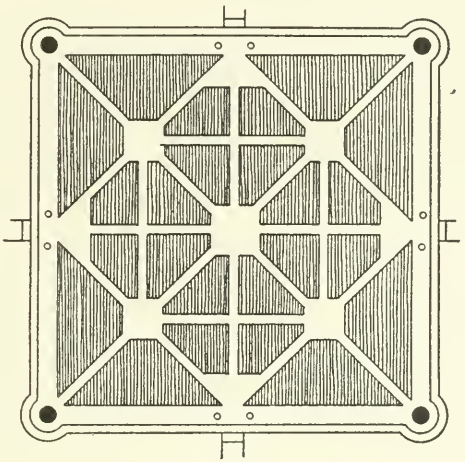


FIG. 24.—HENRICHEMONT

At Mannheim, a city which within the last half century has increased its population fivefold, the heart of the city is enclosed within a "ring," and has been divided into 136 equal squares on either side of one principal avenue leading from the bridge across the Neckar to the Grand Ducal palace. The streets are distinguished according to the American system by letters and numerals.

The plan of Henrichemont (Fig. 24) is a curious one.

It is contained within an exact square with a bastion at each angle; diagonal streets connect the four corners and also the centres of each of the sides, which coincide with the four principal entrances to the town.

The plan of New York consists of a vast collection of over two thousand blocks, with streets so narrow that none are wide enough for any building or monument to be seen to advantage. When in 1807

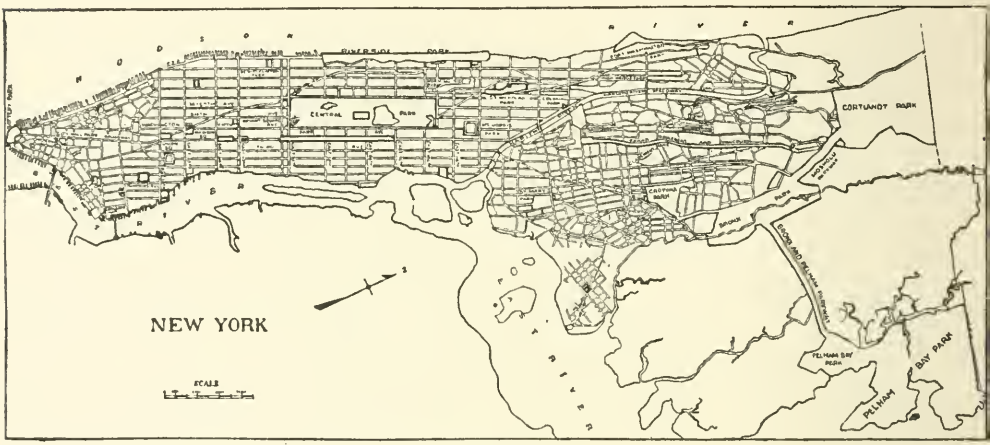


FIG. 25

a Commission drew up the plan of the city, the only irregular thoroughfare was Broadway. The great commercial street had already too great an importance to be molested, and so now it remains as the only picturesque thoroughfare in the city. Some of the streets in New York are over twelve miles long. No attempt has been made to utilise the beauties of the Hudson River, and every street terminates abruptly at the waterside without any intervening quay or

promenade. The Commission of 1807 laid down—tradition says with a mason's hand sieve—the familiar chessboard plan. Broadway has developed into the great business street of the city, and if it be true that "the shopkeepers go where the travel is," the value of the diagonal line for purposes of traffic is well attested. In a review of the Commission's work, Mr. F. L. Olmsted points out some of the faults of this chessboard system of planning:—"Some two thousand blocks were provided, each theoretically two hundred feet wide, no more, no less; and ever since, if a building site is wanted, whether with a view to a church or a blast furnace, an open house or a toy shop, there is, of intention, no better place in one of these blocks than in another. . . . If a proposed cathedral, military depôt, great manufacturing enterprise, house of religious seclusion or seat of learning needs a space of ground more than sixty-six yards in extent from north to south, the system forbids that it shall be built in New York. . . . There is no place in New York where a stately building can be looked up to from base to turret, none where it can even be seen full in the face and all at once taken in by the eye; none where it can be viewed in advantageous perspective. . . . Such distinctive advantage of position as Rome gives St. Peter's, London St. Paul's, New York under her system gives to nothing."

The city of Philadelphia, like New York, is divided into rectangular blocks, desperately monotonous. The plan has been carried out as it was con-

ceived by William Penn, with straight streets and rectangular blocks without curves or diagonal lines, but unfortunately the open squares and parks which he had planned at intervals were omitted. Two of the streets which intersected the level tract of land about the middle met in a big open space round which were to be placed the more important public buildings. Although there is little of art or science about the plan, there is sufficient foresight to appreciate the importance of open spaces. Penn's plan shows five such spaces, each half as large again as an ordinary block, which works out at about one-thirtieth of the total area of the plot. Had this proportion been continued as the city increased beyond this district and as the Consolidation Act of 1854 directed should be done, there would now have been no less than two hundred and eighty small parks within the city plan, instead of the forty-five that actually exist.

The third system that has been often adopted in town planning schemes is a combination of the radial and rectangular systems. A good example may be seen in the modern alterations to the plan of Antwerp (Fig. 27), where a number of central focal points either already existing or newly created at suitable spots are connected with one another by means of direct lines of streets. In this way a network of main streets has been set up, with triangular and rectangular building blocks between. The traffic is well provided for by such a system, but it is important to avoid turning it into all the streets, a defect

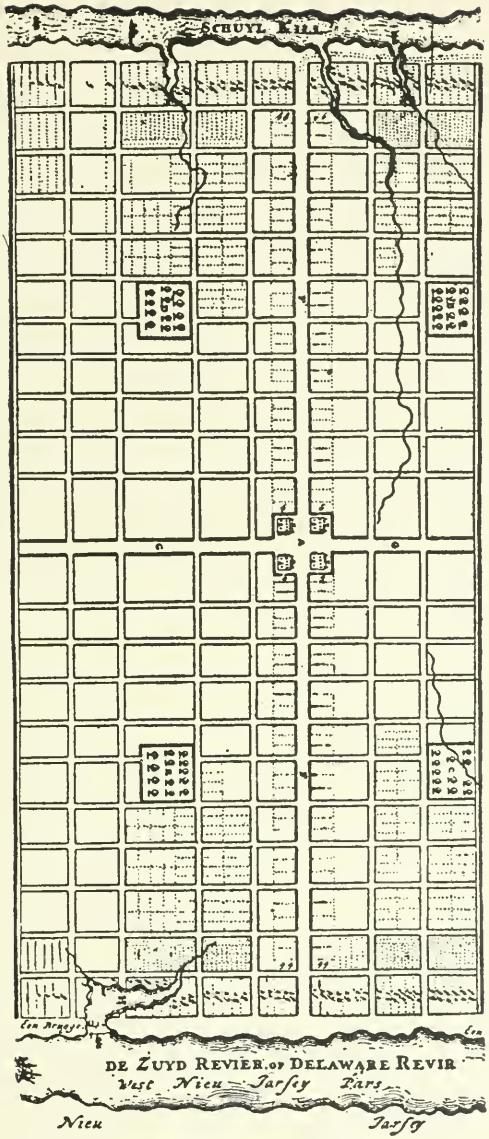


FIG. 26.—WILLIAM PENN'S PLAN OF PHILADELPHIA

which is likely to occur if the system is thoroughly carried out. Other drawbacks are the creation of many acute-angled corner sites, and the impossibility of providing closed-in architectural squares. In cities which have the good fortune to be intersected by a river, like London, Paris, Vienna, Rome, and Florence,

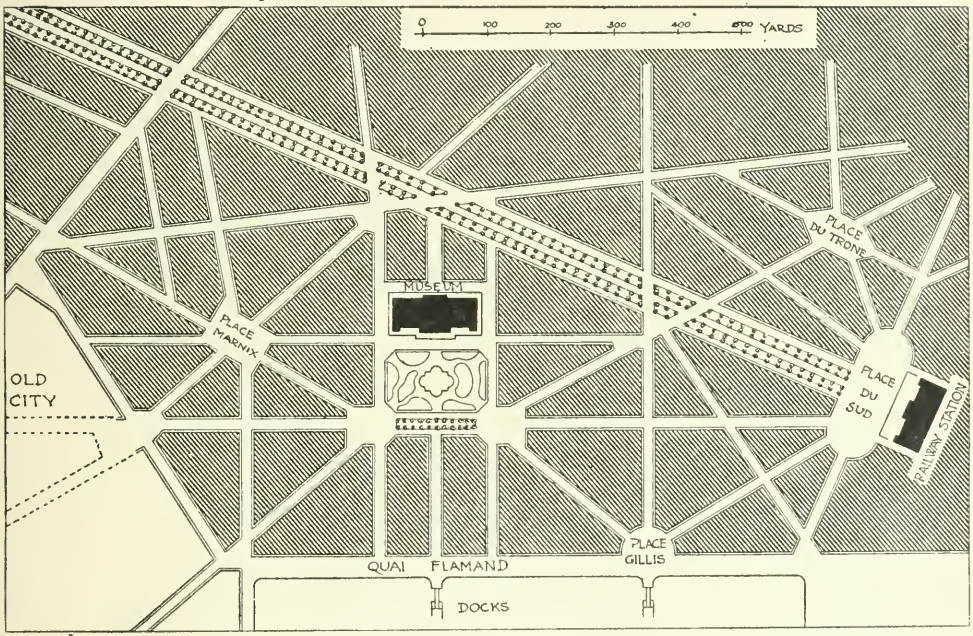


FIG. 27.—THE "QUARTIER DU SUD," ANTWERP

we find a powerful motive for the use of radial plans, namely, the bridges crossing the river, to which all the main lines of traffic must converge.

An interesting example of this type of the combined radial and chessboard system may be seen in the plan of Dalny (Fig. 28), the new city that is being built as a seaport terminal for the Trans-

Siberian railroad. There are many diagonal arterial thoroughfares. The crossing points of the different systems of radials create a number of local centres,

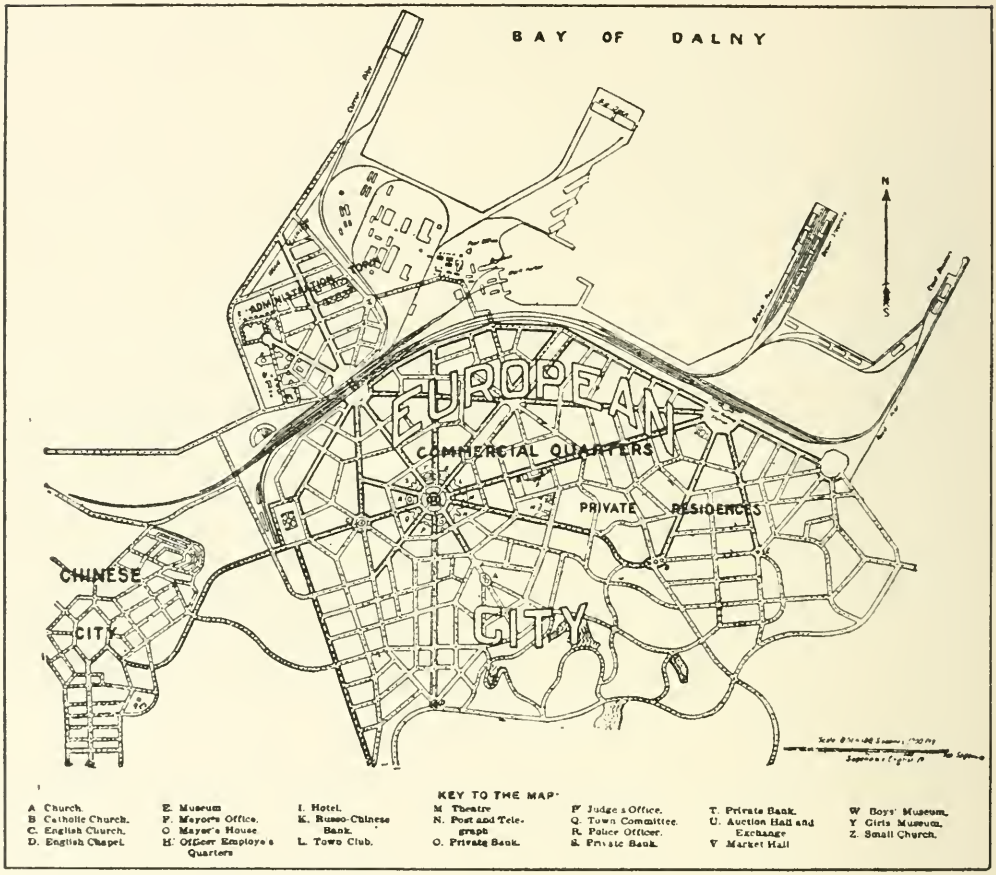


FIG. 28.—DALNY, THE SEAPORT TERMINAL OF THE TRANS-SIBERIAN RAILROAD

the most important of which has been planned in front of the railway station. In the heart of the town a circular public space has been laid out, with ten long straight streets converging upon it.

Built round this, with excellent effect, as may be imagined, there are ten structures, each in its separate block. The city is divided into various quarters, the Administration Town on the north, with three broad thoroughfares leading to the railway station; the commercial quarters in the centre of the city, radiating from one large *rond-point* round which are gathered

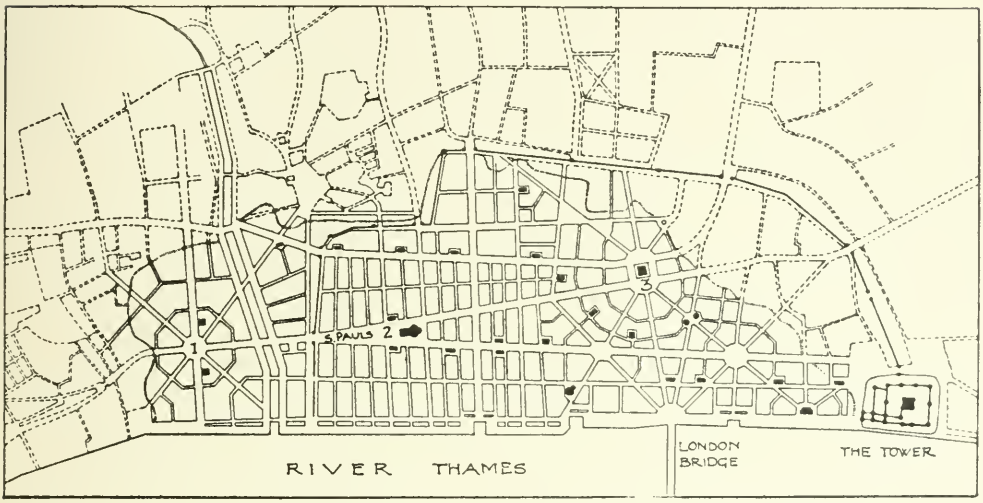


FIG. 29.—SIR CHRISTOPHER WREN'S PLAN FOR THE REBUILDING OF LONDON AFTER THE GREAT FIRE, 1666

the important public buildings; the private residences and parks, grouped together on the south-east, and the Chinese quarters in a separate city on the south-west.

The combination of the radial and chessboard systems is particularly adaptable to the addition of new areas to old cities. The plan of Sir Christopher Wren for the rebuilding of London after the great fire of 1666 (Fig. 29), is an example of this com-

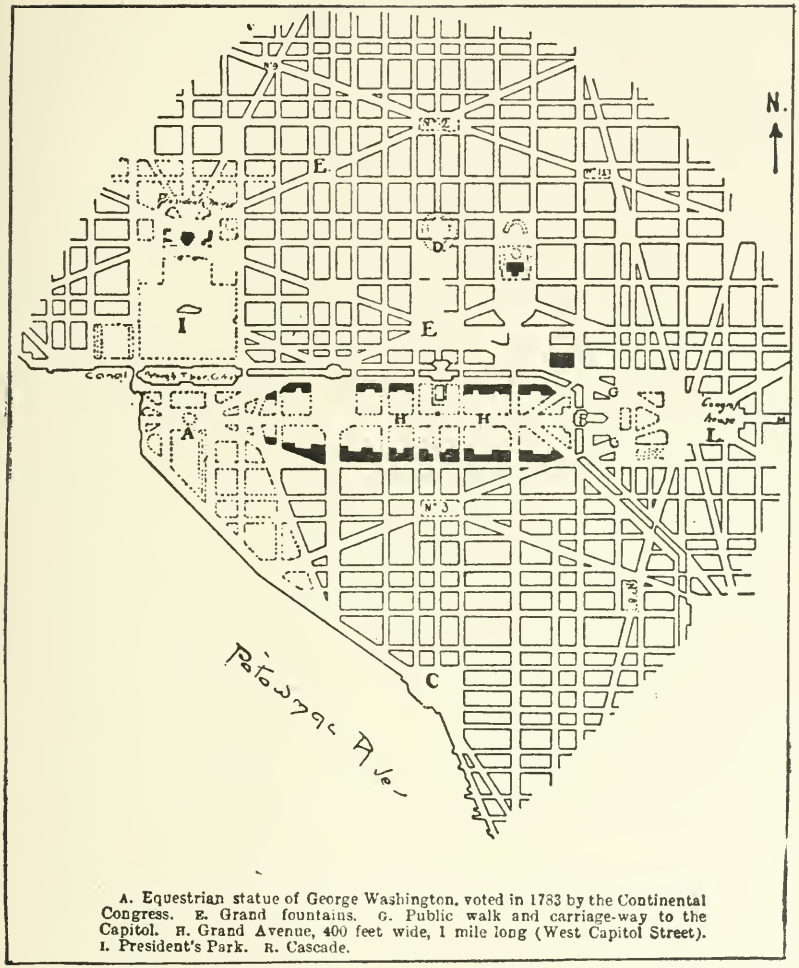
bination. Had Wren's plan been carried out it would have rendered London superb among the cities of the world. It was a supreme effort of genius far in advance of the age, and is quite in accord with the best principles of town planning to-day. The design was accepted by the King, but the necessity of immediate rebuilding, difficulties of compensation, and the want of money prevented the scheme being carried out. Wren was handicapped by the lines of the old streets that had not been burned, but he utilised these as a basis of his scheme, which covered an area extending along the Thames from Temple Gardens in the west to the Tower in the east. The main features of the plan going from west to east were to be: (1) A *rond-point* from which eight streets were to radiate, the eight to be connected with one another at a suitable distance from the centre by cross streets, together forming an octagon. The principal streets were to be at least 90 feet wide, lesser streets to be 60 feet. (2) A triangular space opening up a fine vista of St. Paul's Cathedral. (3) The Royal Exchange to be placed in an open space and surrounded by the Post Office, the Excise Office, the Goldsmiths' Insurance Office and the Mint. Wren intended this to be the commercial centre of the city and would have made it the finest traffic place in Europe, with ten radiating streets each 60 feet wide. Three of these extended to the river-side, affording a fine view of the Exchange from the river, which was to be embanked with a spacious quay the whole way

from the Temple to the Tower, clear of all buildings along the river side, while the Fleet ditch was to be made into a canal 120 feet wide to be crossed by high arched bridges. The sanction of Parliament was obtained for this, but the leading merchants in Thames Street defeated one scheme, and the Fleet ditch itself settled the second. In front of London Bridge was to be a large semicircular space with radiating streets to readily diffuse the traffic. An alternative plan for dealing with the space in front of St. Paul's Cathedral exists in the collection at the Soane Museum; it shows the cathedral precincts, surrounded by columns somewhat after the manner of Bernini's colonnade in front of St. Peter's, Rome. Wren's plan is a wonderful example, showing the use of broad straight streets as a means of linking up a series of monumental buildings. There was an ample provision of commanding sites for important structures. The variety of perspective given by the use of diagonal and of curved streets, and of open areas with their changing points of view, has, so far, never been bettered in any of the accepted plans of Paris, Vienna, or Washington. It is melancholy to think that this great scheme, like that of San Francisco in recent years, was brushed aside by the haste of the commercial interest to begin rebuilding and by the unwillingness of the citizens to co-operate for the common good.

The plan of Paris, as developed during the seventeenth and eighteenth centuries and finally

completed in the nineteenth century by Napoleon III., guided by the genius of Baron Haussmann, is another example of the successful treatment of the radial system. "Napoleon III.'s idea was primarily utilitarian, and though he did not despise artistic considerations, he was unsympathetic towards them. Questions of strategy always dominated questions of traffic. Had he been left to himself, he would have made Paris very like London or, worse still, like New York or Chicago. But to the everlasting advantage of all who love beautiful cities, there was placed in his path precisely the man best qualified to supplement his own good qualities—Georges-Eugène Haussmann. . . . The great merit of Haussmann lies in the fact that he was able and willing to grasp the entire problem which confronted him. There was never any question of expedient, of doing an imperfect task to tide over an emergency. The proper and perfect solution of a difficulty was sought and executed; he perfectly understood the plan of Paris as an organised unity, the result of many centuries of growth. He accepted gratefully what his predecessors left him, and all his effort was really only the completion of their work."[1] Haussmann was imbued with the great idea of the necessity of opening up the old insanitary areas and letting light into them, and here he was certainly not wrong, but at the same time he would have done

[1] "Baron Haussmann and the Topographical Transformation of Paris under Napoleon III.," *Architectural Record*, September, 1907. Edward R. Smith.



A. Equestrian statue of George Washington, voted in 1783 by the Continental Congress. E. Grand fountains. G. Public walk and carriage-way to the Capitol. H. Grand Avenue, 400 feet wide, 1 mile long (West Capitol Street). I. President's Park. R. Cascade.

FIG. 30.—SECTION OF L'ENFANT'S MAP OF WASHINGTON (1791), SHOWING SITES SELECTED FOR PRINCIPAL FEDERAL BUILDINGS

better not to have so completely destroyed the quaint picturesqueness of old Paris.

The plan of the city of Washington (Fig. 30) is another interesting study of the combination of the chessboard and radiating systems. The original plan was matured by the French engineer Pierre Charles l'Enfant, acting under the intelligent judgment of George Washington, after a careful consideration of many European city plans. L'Enfant was called upon to elaborate a partly existing chessboard plan, and in the preparation of his scheme the positions of the buildings and parks were mapped out on broad and effective lines, so as to obtain harmony as well as utility in grouping the whole scheme into one unit. Washington must of course be regarded first of all as the capital city, and the points from whence the thoroughfares radiate, which, in most cities, would be essentially for traffic purposes, have been planned more with a view to the effective display of Government buildings and monuments. Thus one of the principal thoroughfares, that which unites the Capitol and the White House, is the centre of a star, with sixteen important streets converging.

"Prominent points," says Mr. Glenn Brown,[1] "were selected for the principal buildings and monuments. Stretching from the site of the Capitol to the site of a proposed monument, the broad reach of the Mall was planned, and crossing at right angles to this site was the axis of the Executive Mansion and park.

[1] Mr. Glenn Brown, "Historical Sketch of Washington."

Radiating streets from central points, with buildings or monuments at the end of pleasing vistas, formed another feature of special beauty. The fundamental idea of the scheme was a dignified, formal, and artistic approach and setting for these principal architectural monuments. The plan does not appear to have been copied from any existing city. The radiating streets and vistas of modern Paris were all devised under the two Napoleons, and L'Enfant's and Washington's plan was drawn in 1791.

"The plan of the streets with their noble vistas and the outlines of the park system were executed, and the Capitol and Executive Mansion were built on the sites selected. From this point in the development of the city of Washington to the present day the idea of a general and harmonious scheme seems to have been forgotten, and the landscape of each section of the Mall has been treated as if it were an individual park and had no bearing or effect upon the Capitol, Monument, or Executive Mansion. Although these parks may in one or two instances be beautiful in themselves, the object and end of the original designer has been ignored, and the country has lost the opportunity of seeing one of the grandest architectural and landscape effects which has ever been devised.

"The general design suggested buildings on the north and south of the Mall, which was evidently intended to be an open space with boulevards ornamented with planting, sculpture, and objects of art, similar to the grand openings in Versailles and

Fontainebleau. Instead of following this grand scheme as devised, the Government buildings in Washington have been located wherever whim, fancy, or local interest dictated at the time of their erection. The effectiveness of vistas on the avenues has been destroyed; the utility, unity, and grandeur of massing or grouping such structures has been ignored, parking

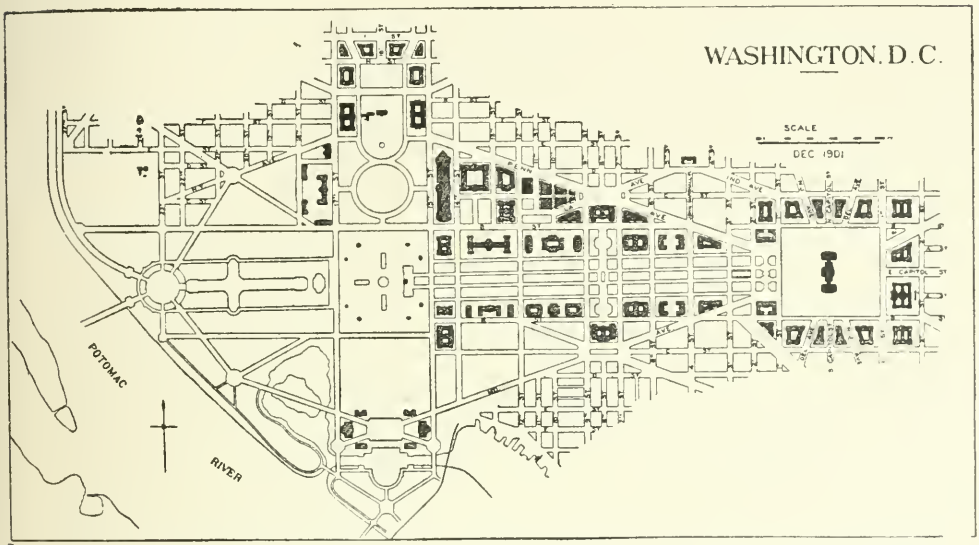


FIG. 31.—DIAGRAM OF A PORTION OF WASHINGTON SHOWING PROPOSED SITES FOR FUTURE PUBLIC BUILDINGS

destroyed, and the building of noble structures scattered without design or reason."

Wherever this plan has been deviated from during the past century it has been found to be a mistake, and recently a Commission formed by Congress, after a careful survey of the entire question, practically advised the return in its essential lines to the plan as first developed by an engineer and a statesman, so that

after the lapse of over a century there seems to be some probability that Washington may yet rival Paris as the best laid out city in the world.

From time to time many ideal schemes for town planning in an academical way have been suggested. In nearly every case these are founded upon some geometrical figure—a square or triangle or the favourite hexagon. But such schemes, though they appear well on paper, are almost impossible to carry out in reality, because they could only be carried out on a level plain, and they pay little or no regard to the natural features that are generally the primary reason of a city's location. At the same time such ideal plans have their value. The most successful form that has been yet devised is the hexagon, of which type we illustrate two examples, both having certain points to commend them. It is claimed for the hexagonal type that it permits the development of the city to the utmost that might be possible within many decades, because, with the hexagon, the great advantage of the diagonal line is secured and at the same time many intervening spaces are provided that are so much in demand in all city plans.

The design of Herr Rudolf Müller of Vienna (Fig. 32), who recently published the result of his studies in the *Oesterreichische Wochenschrift für den Oeffentlichen Baudienst*, shows much originality. In the course of a descriptive article he says: "Should the blocks of buildings be hexagonal on plan and bounded by streets, these streets of regularly broken lines would effectually

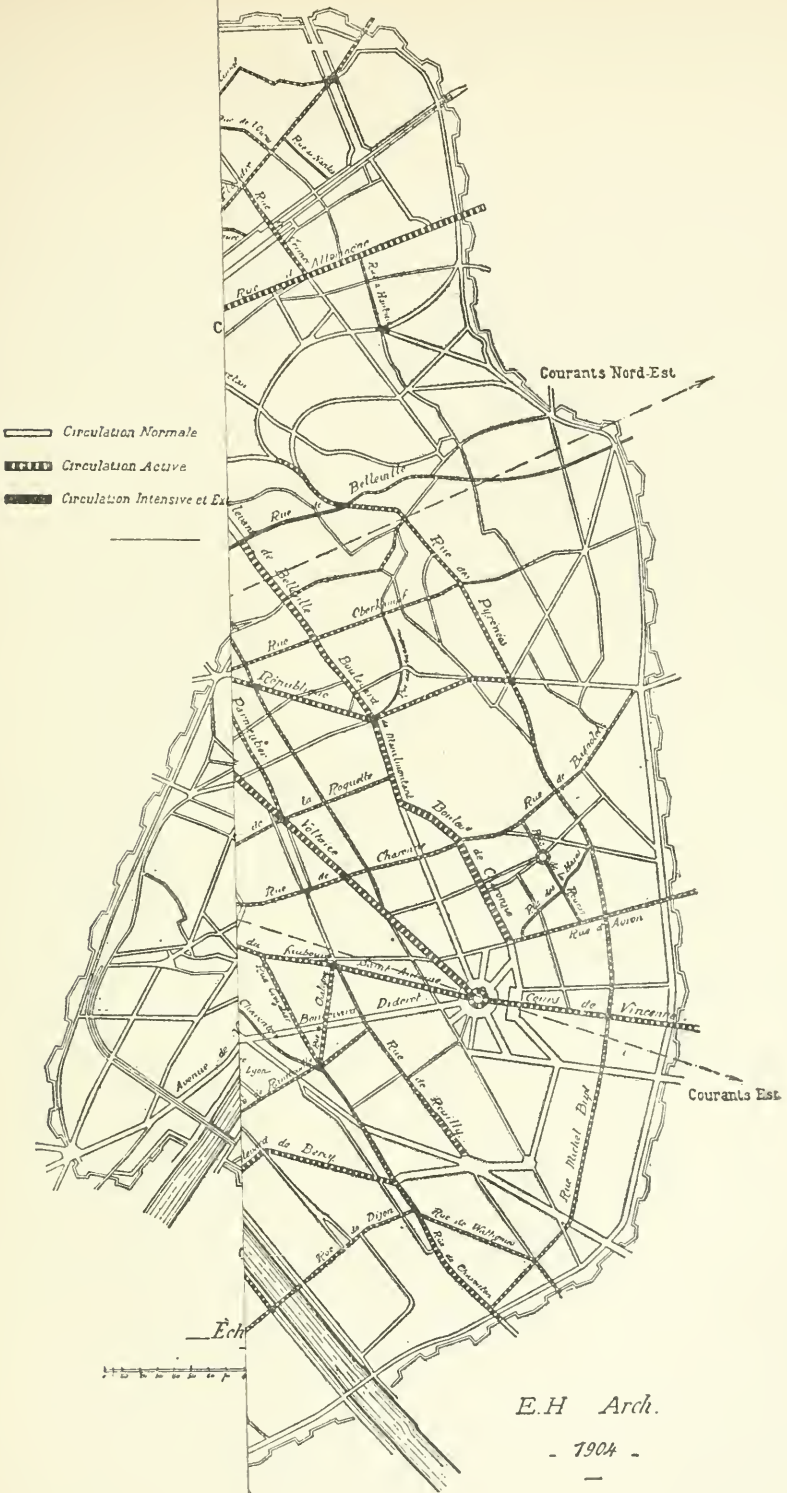

Courants Nord-Est
Courants Est
Circulation Normale
Circulation Active
Circulation Intensive et Ex
Belleville
Pyrénées
Parmentier
Voltaire
Charonne
Didérot
Vincennes
Rapée
Dijon
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FIG. 35.—PARIS IN 1906. PLAN SHOWING THE TRAFFIC CIRCULATION

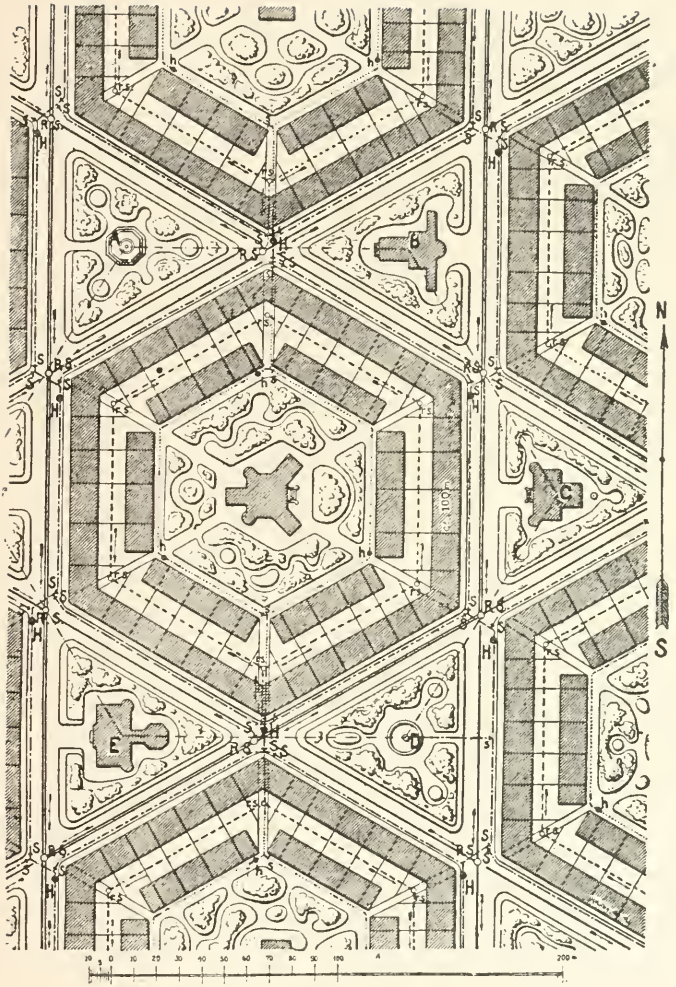


FIG. 32.—SUGGESTED HEXAGONAL PLAN BY HERR R. MÜLLER

prevent laying down the shortest line of communication between any two points. Therefore the hexagonal units must be so grouped that the streets may assume a straight or at least a continuous direction. The figure shows the severest type of plan, which admits of much modification and variation in the size and shape of the hexagons, without affecting the main principle. The three straight thoroughfares, bounding the site and crossing each other at angles of 60 degrees, also bound triangular spaces, which transform each block into a six-pointed star. The invisible lines joining the centres of these triangular spaces form an invisible hexagon, which is the basis of the whole plan. These triangular spaces are invaluable as open spaces, and their central points form suitable sites for tea-house, restaurant, or monument, or even for three villas set back to back so as to enclose a small triangular yard or area. The hexagonal building site would be most advantageously laid out if the street façades were continuous; six detached blocks, parallel to the sides of the hexagon, could then be erected within the space enclosed, and these in their turn would bound the inner enclosure, laid out as a garden, whose centre would serve as a site for museum, school, pleasure resort, &c., or six villas could be built back to back so as to enclose a hexagonal area. An entrance effected at each angle of the outer hexagon would establish ready communication between the main thoroughfares and the centre of the hexagon. The street front of the hexagonal block would measure about 100 mètres, as this length equals

the usual distance between two fire hydrants and between two inspection-chambers. The middle of the street would be reduced to a minimum and fixed by traffic alone, for the house frontage would have no buildings opposite and would be disposed in short lengths alternately right and left of the thoroughfares. The main thoroughfares would run parallel to the long axis of the blocks of buildings and measure about 20 mètres in width. Fifteen mètres would suffice for the cross streets. The entire surface of the unit would measure 41,250 square mètres, or about 10 acres, which would subdivide as follows: 30 per cent. buildings, 40 per cent. streets and areas, 30 per cent. gardens."

The advantages, according to Herr Müller, can be summed up thus: (1) The hexagonal blocks have no north façade when the long axis of the building, *i.e.*, the main streets, run north and south, so that sunless dwellings are excluded; (2) all dwellings have one garden front, the main blocks looking out on the triangular gardens, the inner blocks on to the central garden; (3) numerous suitable sites for public monuments and fountains are provided; (4) the street vistas would be charming, even with rectilinear streets, on account of the alternate grouping of buildings and trees; (5) as every plot would include some building of architectural importance, uniformly good rents would be secured, added to which a greater density of building would obtain than is possible in the rival method, *i.e.*, detached buildings; (6) the water supply, drainage,

&c., would be laid down on the simplest, most easily controlled plans and at the cheapest cost.

The plan of Mr. Charles R. Lamb (Fig. 33) is based upon the idea that it is important to form a series of centres about a city each of which may be devoted to one specific object. "The tendency," he says, "of different businesses to centralise in one locality has been recognised for many years. This tendency is not restricted merely to business, however. Theatres and

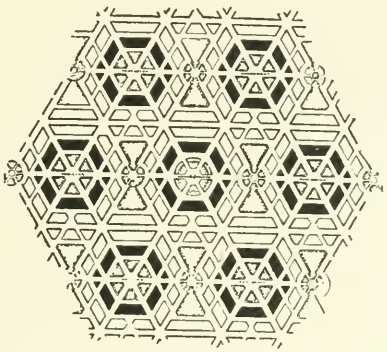


FIG. 33

all buildings for the recreation of the people gravitate towards one quarter of the city. Educational institutions, hospitals, &c., each in turn are found gravitating towards their fellows. This tendency suggests that in the model city such areas should be located in zones of learning, zones of pleasure, zones of medicine and surgery, zones of business, &c. They in turn would have from them radiating through the nearer territory such buildings as would instinctively consort with the idea presented by the zone. Thus each zone would have not only its administrative buildings but also

buildings of habitation; the minor businesses for local distribution; the schools to serve the children of the zone, &c. In this way each zone, in its own group, would be practically a city complete, self-supporting, divided from its neighbouring zone or city by a small park, and yet connected with it by the diagonal streets. The power of extension of such a plan is infinite. The danger of congestion by the excessive growth of cities has been eliminated, or, at least, reduced to its minimum." In the illustration the central district is devoted to administration, surrounded by centres of education, medicine, banking, dry goods, publishing, and amusement.

But it is not in any geometrical pattern, or in fact any "system" whatever, that we are likely to hit upon the correct method of dealing with the traffic requirements of cities in the future. If all the requirements of traffic in the future are to be fulfilled, no purely rectangular or radiating system is likely to be of any great use. "Success in town planning," says Stübben, "is more likely to be attained by seeking out the natural topographical conditions. A full consideration for the levels, roads, and boundaries must be the basis upon which all schemes must rest, and these considerations can only be left out of account if they become antagonistic to the legitimate requirements of traffic and town extension, or for economic or æsthetic reasons. The closer a town plan adheres to the natural conditions, the more original and attractive it will be. The filling in of the secondary roads to the

main network of thoroughfares should be approximately rectangular, because the rectangle is the most convenient form of building block, and for the actual traffic requirement the diagonal system can always be resorted to. The radial form of arrangement is advisable for important focal points ; town gateways, railway stations, the approaches to bridges and similar situations. Curved streets adapt themselves as a rule better to hilly ground than straight ones ; for wide vistas, distant perspectives, and grand monumental effects the straight line asserts itself. The day has gone by for the unqualified employment of definite systems ; henceforth they should not play a ruling but a subsidiary rôle."

The individual formation of streets and open spaces—each fitly proportioned to its object—can give to the modern town an interest quite as great as to those of centuries ago. Open traffic places, closed architectural places, streets varying in width as occasion demands, street frontages advancing here and retiring there, the effective placing of monumental buildings, fountains and statues, well planned gardens and parks ; all these are elements that the modern town planner has ready to help him without resorting to any set plan. The separate parts of a town should each be distinct. The business and dwelling quarters, the manufacturing and workmen's quarters, each should express its own individuality as each differs considerably in its requirements. The fusion of all these components into one united whole will represent our ideal city of the future.

CHAPTER III

THE CIRCULATION OF TRAFFIC

THE first essential to be considered in laying out the streets of a city should be that they conform readily to the requirements of the principal currents of circulation.

Nothing is of more paramount importance to the prosperity of a city than free circulation. The larger the area the more imperative it is that there should be ample facilities for the rapid circulation of traffic throughout the whole system of its streets, and in all schemes for street improvement, proper provision must be made not only for local requirements, but also for the through currents of traffic. It is these through currents which scattered improvements so often fail to benefit.

In laying down, then, an ideal plan for town improvement, there should first be drawn up a comprehensive scheme, involving the production of two or three maps showing what the principal lines of traffic circulation have been at intervals of, say, every two

generations. A further plan might then be made showing the congested streets as at present, and from this information could be prepared the final scheme, allowing adequate provision for through traffic from point to point, it may be from the railway station to the docks, from one railway terminus to another, or connecting the great markets. These main arteries should be direct, broad, straight, and as far as possible free from all steep gradients. At the focal points there should be open traffic spaces, and from these, other secondary streets should radiate. Although it is inadvisable to attempt to manufacture the picturesque element, which must be inherent in the site, and cannot be artificially brought about, yet in the planning of new parts or the alteration of existing parts of a city some definite scenic effect should be striven after, with streets having an architectural relation to each other, either being focussed to some important centre, or having their vista closed by some monumental building.

These focal points should be the deciding factors in the positions and directions of the principal streets. Thus in Paris the focal points which have decided the plan were the Opera House, the Madeleine, the Trocadero, &c. The elementary idea of a small and simple town—such a town as stands on cross roads in a rural district—is to place at the meeting of the roads, the market place, the town hall, the church, and any other public buildings which represent corporate life. If a town is of such a size that its public life can be

accommodated by four or five public buildings, and if the functions of these public buildings are so limited that their contiguity is a convenience, and not, by reason of congestion of traffic, an inconvenience, then such a collocation is in all ways admirable. In a large city such focal points may be either places for the distribution of traffic currents or perhaps an approach to a railway station or a bridge, but unless they are of large extent and very carefully planned it is usually inconvenient to have a great company of public buildings of different functions close together, nor is it wise to allow a multiplicity of roads to converge on the site of a public building or group of buildings, as the amount of traffic that will then converge to one point becomes a hindrance rather than an aid to circulation.

In an interesting essay on the circulation of traffic in modern towns M. Eugène Hénard[1] lays stress on the fact that a town's prosperity, being the result of the efforts of its inhabitants in all branches of human activity, depends enormously upon the facility with which traffic is able to circulate, and consequently the establishment of a rational system of circulation becomes one of the most powerful factors of public wealth. Circulation, says M. Hénard, in a general sense being but the sum of individual circulation, it is first of all important to define what individual circulation is. By the term we mean the double movement

[1] To whom I am much indebted for permission to make use of his valuable research and the loan of diagrams.

of every inhabitant who sets out, be it on foot or on wheels, to attain a determined goal, and who, having attained this goal, returns to his home. At first sight, this double movement appears to be identical in its two phases. There is, however, a notable difference between the going and the returning: the former is nearly always more rapid, because in the majority of cases it leads to a meeting of a certain number of persons at a fixed hour; the latter, on the contrary, is slower, because it can be performed at leisure. By the former several individuals converge towards a given point—by the latter they disperse. As to the circulation of carriages and merchandise, we must consider that as a result of individual circulation, since the movements correspond with those of a driver, a porter, or a huckster.

Since the advent of automobilism the Parisian streets, like those of London, have proved too narrow. Already streets, having a width of from 30 to 40 feet, with a road space of 25 to 30 feet, often show a congestion of traffic. In the more recently constructed streets the width has therefore been increased to 65 to 70 feet, with a road space of 40 feet, which is considered sufficient to allow the passage of five carriages abreast or two rows of stationary vehicles along the pavements with a double central circulation. The larger avenues and boulevards of the Haussmann type are nearly always 100 feet from house to house, with a road space of 45 feet, but even these fine streets get blocked when double tramways occupy the middle of

the boulevard, allowing only two vehicles to pass on either side. The largest type of Parisian boulevard is as much as 115 feet between the buildings, with a road space of 55 feet; this width permits seven lines of traffic, moving or stationary. With the growth of automobilism these dimensions will not be found too excessive, for the modern tendency to economise time means an increase of speed, to accommodate which streets will eventually have to be provided with a road space up to 65 feet.

As a study in the growth and development of a city's traffic no better example could be chosen than that of Paris, for no city has made greater efforts in the past to tackle the difficulties involved, and this at a time when none of the other great cities had awakened to the necessity of changing their mediæval streets for something more suitable to modern needs.

The system of focal points, which is the principal feature of the plan of Paris, has much to commend it, but yet the overcrowding of Parisian streets is very marked—a fault that does not lie, however, with the system, but rather is the result of abnormal increase in the density of the population within a very small area. M. Hénard has published an interesting plan (Fig. 35) which shows the density of traffic at various points. It is, of course, very difficult for such a plan to be made by a private individual, but the idea is one that might well be recommended to municipal authorities having congested traffic areas to deal with. In the case of old cities like Paris and London, the necessary thorough-

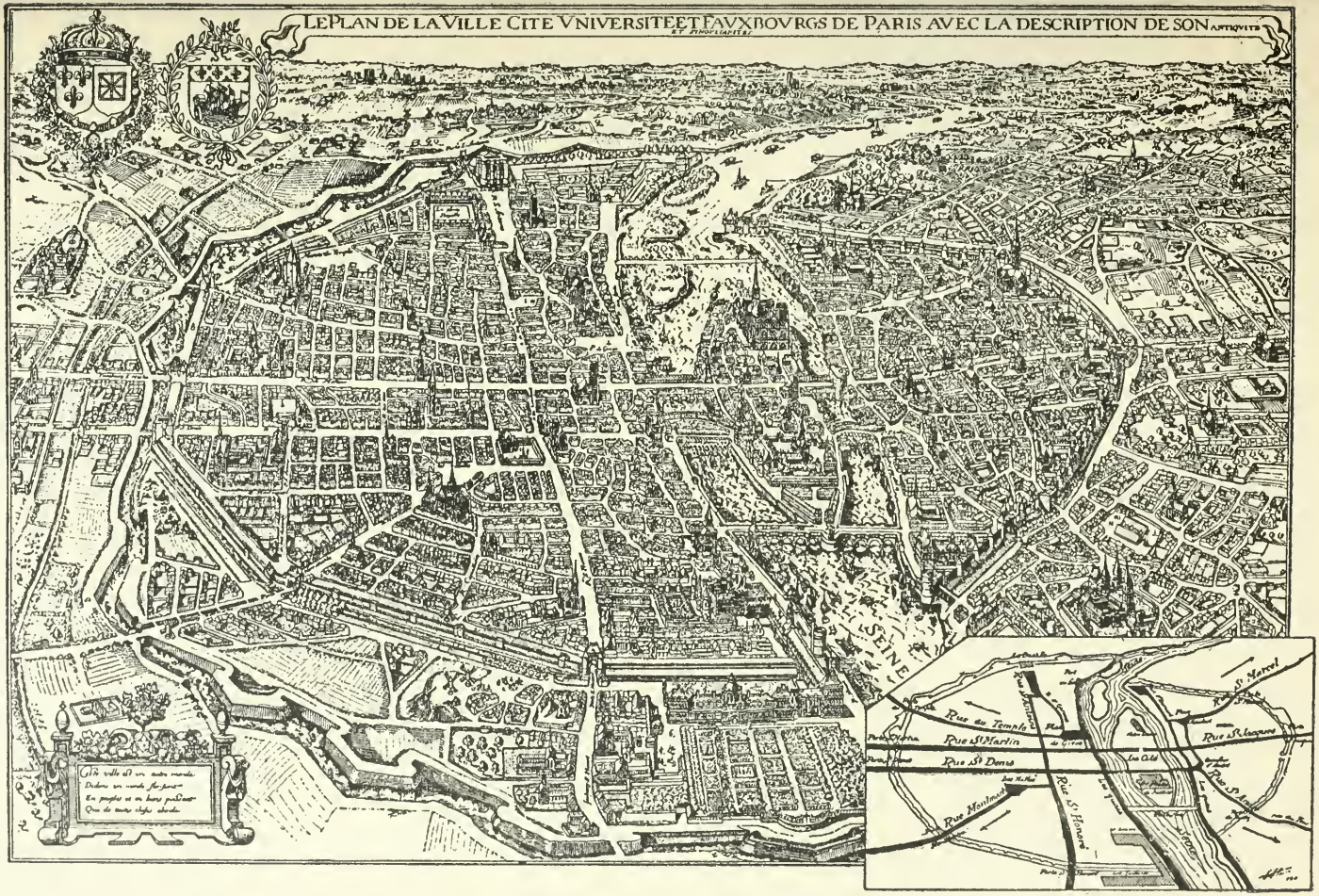


FIG. 34.—PARIS IN 1617, FROM THE MAP OF MATHIEU MÉRIAN

fares can only be cut through at vast expense, but if a clear grasp of the traffic requirements is obtained before, instead of after the improvements are made, much of the money now wasted need never be spent, and a series of such plans of a city made, say, every ten years might be of the greatest assistance in deciding what were the most urgent street widenings and improvements.

To form an idea of the Paris which Haussmann was called upon to develop we must go back to the first half of the seventeenth century. The bird's-eye map of Mathieu Mérian affords a good idea of Paris in 1615, when it was a very prosperous city and had already carried out considerable improvements. The houses extend well beyond the walls, and towards the west the view indicates the new earthworks that had been thrown out to protect the garden of the Tuileries (seen at the bottom of the engraving). The view, together with the small inset plan, clearly shows that the principal lines of traffic circulation were well established at this date. It is easy to distinguish a double line extending right through the city from north to south. Parallel to the Seine are the Rue St. Honoré and the quays bordering the river on either bank. There are four principal market-places—the Halles and the Place de Grêve on the right bank and the Place Maubert and the Carrefour St. André on the left. These four places act as termini to four diagonal streets passing through the city gates to the country beyond. All the river traffic appears to be concentrated along

the right bank. The plan shows clearly the character of the first network of traffic thoroughfares, a little irregular in their lines perhaps, but nevertheless the practical outcome of the city's needs.

Fig. 35 shows the traffic circulation of Paris to-day. In the two centuries that have intervened we find the city increased tenfold. The old thoroughfares still exist, but side by side, in the Paris of to-day, we find an enormous development of other and larger thoroughfares. The plan shows clearly what are the directions followed by the principal currents of traffic (being founded only upon private research it does not of course pretend to have the accuracy of the work of a public department). The white streets are those with normal circulation, the half black and white have an active circulation, and those entirely black have a crowded circulation. If we look closely at this plan we can draw some useful conclusions. The principal currents of circulation are shown to be along the transverse lines from north to south and east to west, constituting an immense cross, but this circulation has not the same intensity along the entire length of the lines; the same applies to the inner ring of boulevards from the Bastille to the Madeleine, where, especially on the south side of the Seine, the circulation is much less than on the "Grands Boulevards" to the north.

Another striking feature of the plan is the evidence it affords that the lines of circulation which we have already noticed in the plan of 1615 remain practically

unchanged at the present time. The diagonal currents have attempted on every side to force themselves through the more crowded parts of the city; thus to the south-west the old Rue du Four has extended itself by the Rue Lecourbe, the traffic of which is doubled by the Rue Vaugirard, and towards the north-west the old Rue Montmartre, having taken its traffic as far as the Church of Notre Dame de Lorette, allows it to continue along two streets that join at that point. This north-west current is, and always has been, very marked. The Rue du Temple and Vieille-du-Temple have developed the north-east current, and the lines have been continued by the Rue de Belleville and the Rue Oberkampf. All this is proof that ancient traffic currents are perpetuated in spite of the most radical changes that may take place. Experience also shows that where a new thoroughfare like the Boulevard Sébastopol (on the north to south axial line) has been laid out it has in no way diminished the importance of the two older streets, Rue St. Denis and Rue St. Martin, that run parallel with it on either side, and that wherever the traffic in a certain direction has proved to be persistent for a long period, the provision of a new thoroughfare tends considerably to consolidate the ancient traffic direction. On the other hand, it is easy to find examples of streets, not planned as the result of a direct traffic demand, remaining but little used from the day that they are opened. The old streets that have already been mentioned and those which

have been planned to prolong them are obviously too narrow and should be doubled. In order to compare the traffic lines of important cities, M. Hénard has drawn a series of plans which will suggest ideas and introduce new elements into the problems for which the study of a single city does not suffice. The cities chosen for comparison are Berlin, Moscow, Paris, and London, because they are all similarly situated inland and upon the banks of rivers, and, moreover, their extent, population, and political importance all presuppose new analogous extension in years to come. We have omitted maritime cities like St. Petersburg or New York, because the conditions which govern their plan are somewhat different.

In all these plans the principal lines of traffic, public spaces, parks and gardens are shown, but for the sake of clearness all other routes, including the lines of railway, have been omitted.

Berlin

The theoretical plan of Berlin shows the centre of the city surrounded by almost concentric streets, the principal being the Neue Friedrich Strasse and the Dircksen Strasse, in the midst of which is the central metropolitan station. This central area comprises a large number of important buildings and is intersected by the river Spree, surrounding an island which, as in the case of Paris, was the site of the first primitive settlement. From this centre the Unter den Linden, bordered on either side with important public buildings,

extends as far as the Brandenburg Gate, a distance of about 1,300 yards, whence the avenue extends through the magnificent Tiergarten in a straight line as far as the Forest of Spandau. The Tiergarten is the breathing space of central Berlin; beyond it on

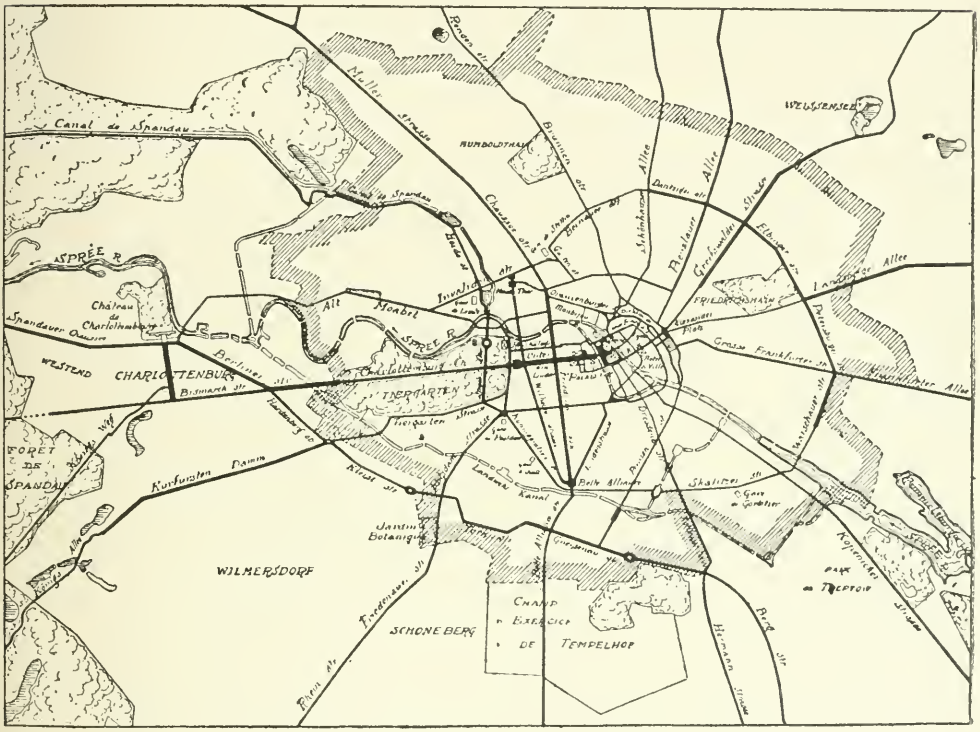


FIG. 36.—PLAN SHOWING THE TRAFFIC CIRCULATION OF BERLIN

the west and south lies Charlottenburg, the residential quarter of the city; to the east is the city itself. The principal thoroughfare passing from north to south is the Friedrich Strasse, which crosses that from east to west about midway in the Unter den Linden. On its way through the Tiergarten, the Charlottenburger

Chaussée is crossed by the Sieges Allee; at each of its extremities two streets radiate, the Heide Strasse and Alt Moabit on the north, and the Tiergarten and Potsdam Strasse on the south. The new quarters of Berlin are rapidly developing westward.

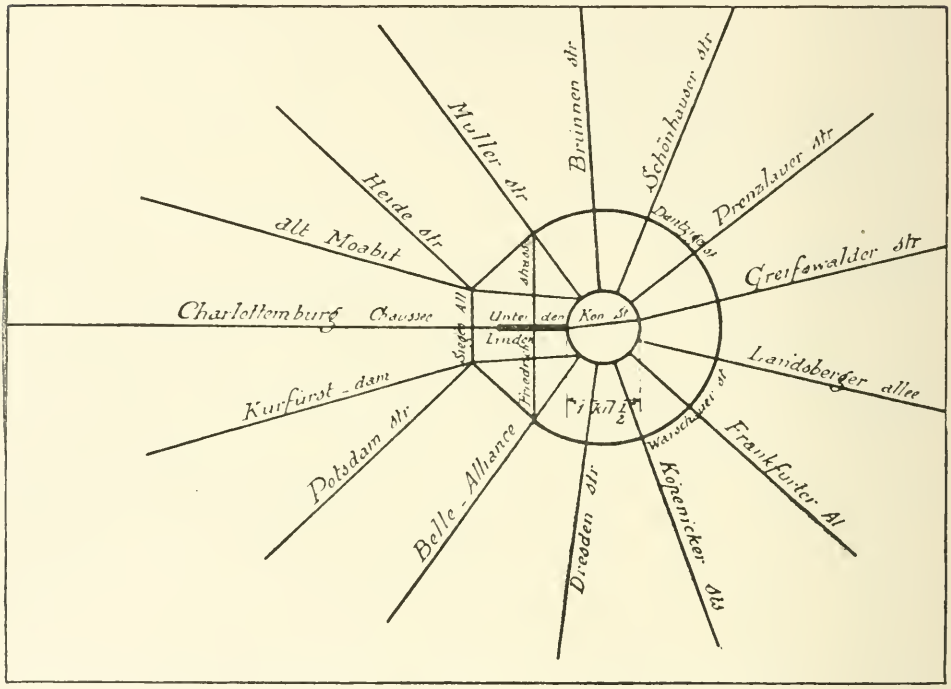


FIG. 37.—THEORETICAL PLAN OF THE TRAFFIC CIRCULATION OF BERLIN

From this simplified network we may, by slightly correcting the irregularities of the plan, draw a purely theoretical scheme (Fig. 37), giving the general plan of Berlin, and showing that the traffic of the city is decentralised, but clearly symmetrical as regards its principal axial lines.

From a dense centre or heart the Chaussée de

Charlottenburg stretches westward straight as a die. Around the heart is an inner ring, and an outer ring or perimeter, whence fourteen streets radiate to the suburbs. Examining this general arrangement, one is not surprised at the rapid growth of Berlin, for this splendid network of thoroughfares has contributed in the most efficient manner towards the economic expansion of the capital.[1]

Moscow

The circulation plan of Moscow (Fig. 38) is even simpler than that of Berlin. Moscow is a semi-oriental town that has had to contend with invasions from Asiatic hordes, and could only maintain its existence by surrounding itself, more than once, with permanent fortifications. Like Paris, it has developed in concentric rings of boulevards. In the centre, on the banks of the Moskowa, stands the Kremlin, a military, religious, and political citadel, enclosing within its walls palaces, churches, convents, an arsenal, a court of justice, and barracks. To the east of the Kremlin stretches the old town. The heart of the city is surrounded by large avenues, gardens, and squares, and eleven thoroughfares radiate from this innermost circle; these are connected, at distances apart of about one thousand yards, by two rings of boulevards, the first consisting of a series of large boule-

[1] The population of Berlin in 1861 was 520,000; in 1871, 826,000; in 1881, 1,500,000, and by 1900, including the adjacent suburbs, it had risen to 2,500,000.

vards, divided by gates and monuments, the second of the "Sadowaia," or Parkway, which, under various names, surrounds the town in an almost perfect circle. Beyond the "Sadowaia" the suburban areas are more or less regularly developed. The theoretical scheme of the plan of Moscow (Fig. 39) shows more

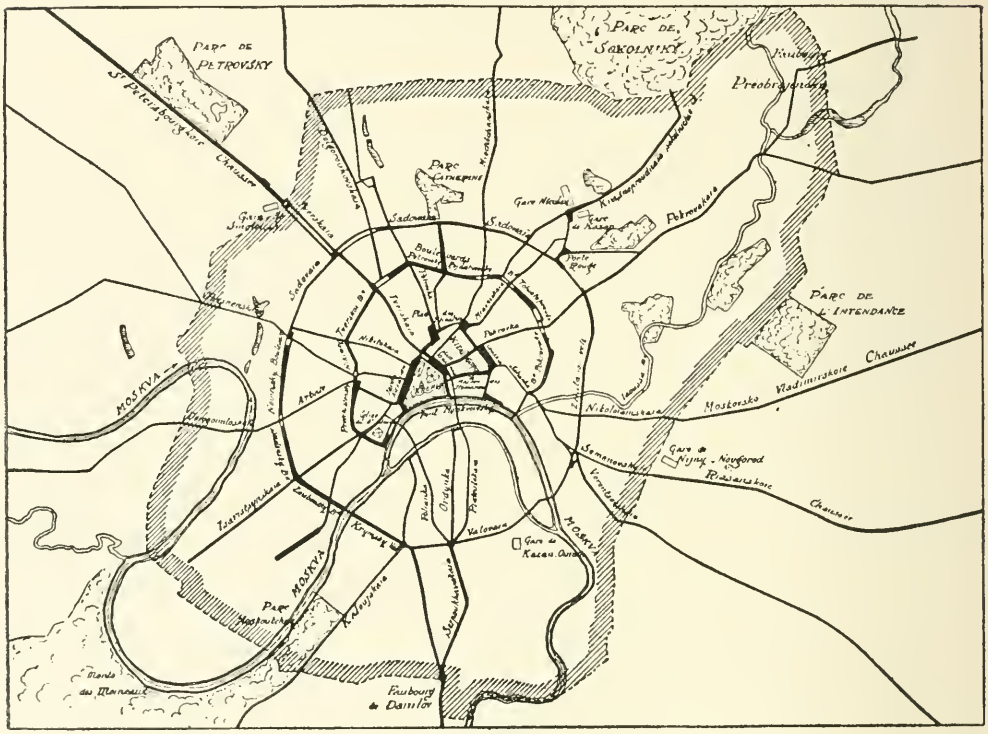


FIG. 38.—PLAN SHOWING THE TRAFFIC CIRCULATION OF MOSCOW

clearly this regular arrangement formed by the three concentric circles, with radiating thoroughfares converging towards the Kremlin, a "heart" trebly defended, in which is summed up the unique authority of the Czar, political, military, and religious.

Paris

The traffic circulation of Paris is shown on Figs. 40 and 41, from which it will be seen that the Seine divides Paris into two parts. Of these the upper part, which includes those districts planned on the convex

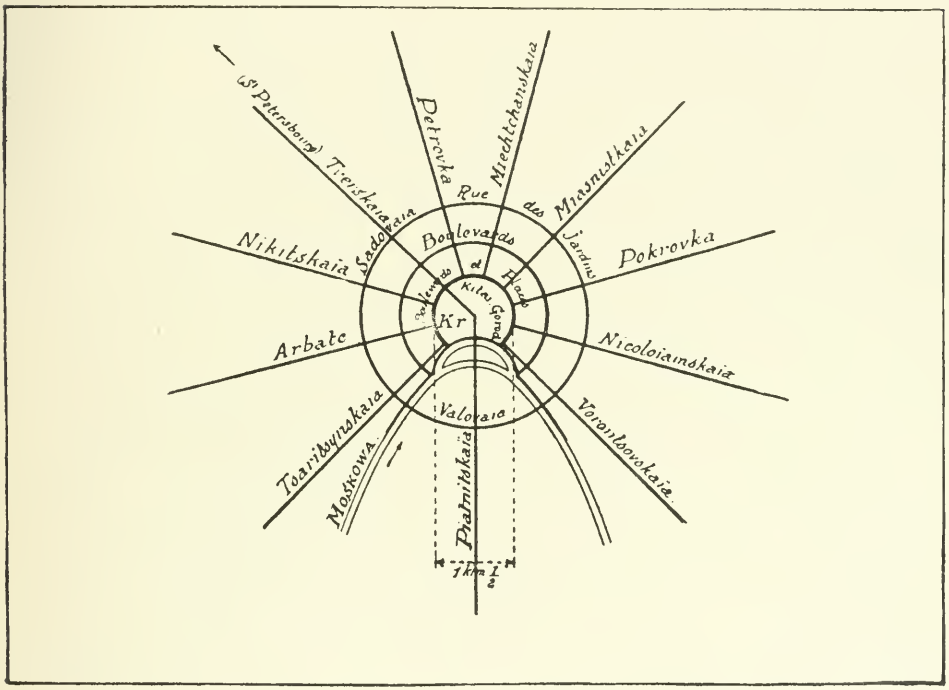


FIG. 39.—THEORETICAL PLAN OF THE TRAFFIC CIRCULATION OF MOSCOW

side of the river, consists of two-thirds of the city's total area. Its plan is clear and well adapted for circulation. The remaining third of Paris, enclosed by the concave bank of the Seine, consists of a confused collection of badly arranged thoroughfares. The two principal lines of traffic east to west (Cours de Vincennes,

Rue de Rivoli, Avenue des Champs Elysées) and north to south (Boulevard de Sébastopol, Boulevard St. Michel) are clearly distinguishable; these form the principal radiating lines. Two secondary traffic lines radiate from the Place du Châtelet (where the Rue de Rivoli crosses

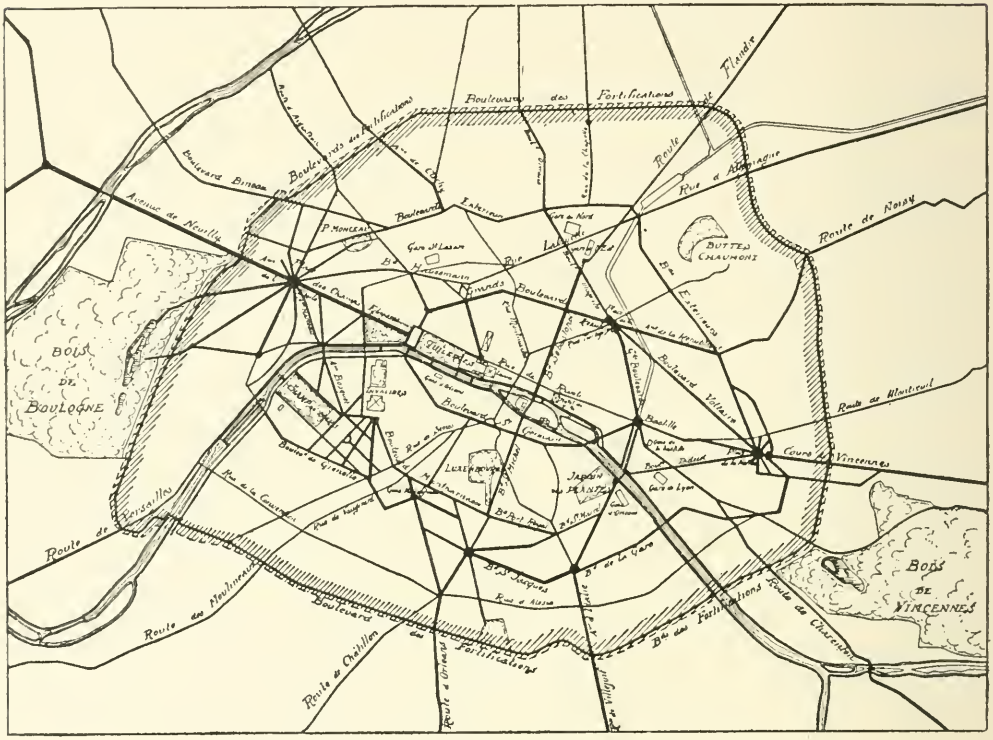


FIG. 40.—PLAN SHOWING THE TRAFFIC CIRCULATION OF PARIS

the Boulevard Sébastopol) in either direction along the banks of the Seine, and another line (the Avenue de l'Opéra) goes north-west to the inner ring of boulevards; other lines (Rue de Turbigo and Rue Montmartre), though much smaller, have some importance as lines of radiation. These radiating thoroughfares are joined

by the elliptical belt of the "Grands Boulevards" and the Boulevard Saint Germain. The Place de la Concorde and the Place de la Bastille are placed at the extremities of the major axis. The Boulevards Voltaire, Magenta, Haussmann and Rue Lafayette are

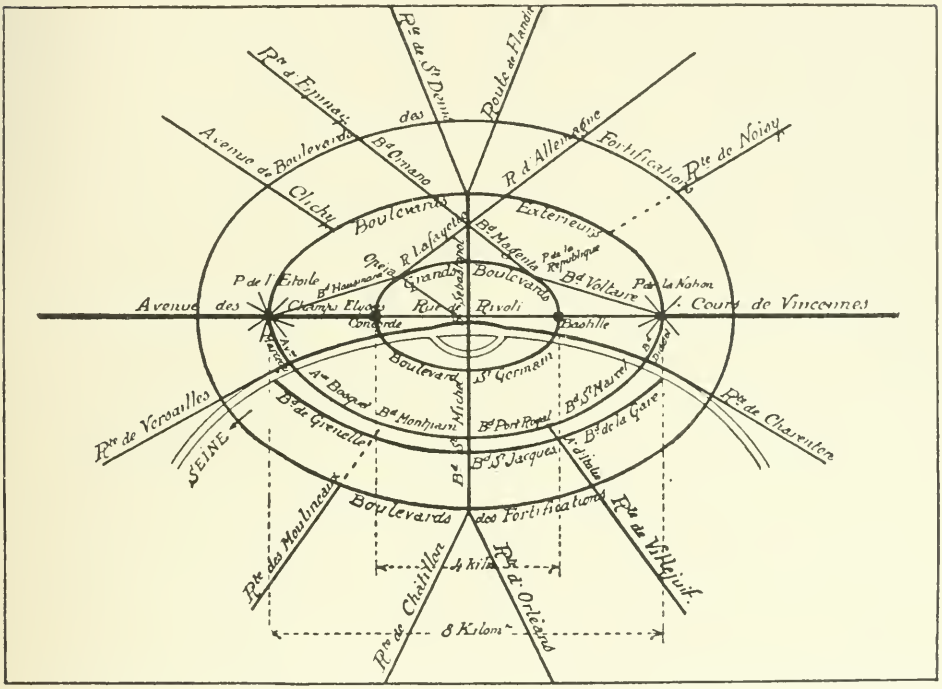


FIG. 41.—THEORETICAL PLAN OF THE TRAFFIC CIRCULATION OF PARIS

placed tangentially to the ellipse. The outer belt of boulevards encloses the city at a distance of about a mile and a quarter from the inner ring. The Place de l'Étoile and the Place de la Nation are at the west and east extremities. On the right bank the line of boulevards is continuous, but on the left bank it is more broken and irregular. A third belt, having a

total length of over twenty miles, has been advocated by M. Hénard upon the site of the existing fortification. It is proposed that this belt shall include no less than thirteen small interior parks. If this scheme is carried out Paris will be unique in the possession of three distinct belts of boulevards. Useful as these belts are to circulation of traffic, it is a decided defect that so many of the radiating thoroughfares stop short at the exterior boulevard and do not penetrate into the heart of the city, the area of which is too much cut up by a labyrinth of small streets, having only the Boulevard Sébastopol and the Avenue de l'Opéra as connecting thoroughfares. The two magnificent traffic places, the Place de l'Étoile with its twelve radiating thoroughfares and the Place de la Nation with ten, are not placed in such positions that they can thoroughly and effectively diffuse the traffic currents. To obviate these defects of traffic circulation M. Hénard has evolved a clever scheme by which the heart of the city would be further divided by two broad thoroughfares running east and west, and, together with enlargements of existing roads north and south, would enclose the heart of the city within a square, from the four corners of which four broad thoroughfares would radiate to the suburbs beyond the outer line of fortifications.

London

Fig. 42 illustrates the principal lines of traffic in London. These are much less defined than in either

of the cities we have considered, and at first sight seem inextricable.

The plan shows a confused network of irregular streets, presenting the appearance of ancient rural highways along which houses have been built. How-

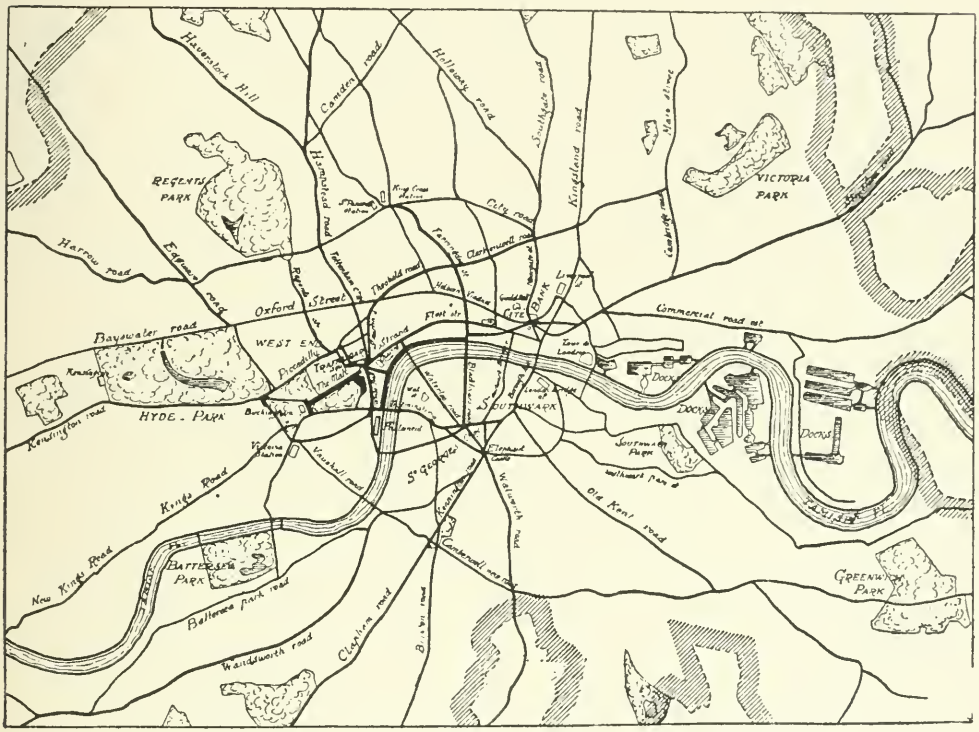


FIG. 42.—PLAN SHOWING THE TRAFFIC CIRCULATION OF LONDON

ever, a closer examination reveals three great cross-roads, or rather three groups of crossroads, from which radiate nearly all the streets and which form the three apexes of an almost regular triangle—*i.e.*, on the left bank, Trafalgar Square and the Bank, and on the right St. George's Circus. Trafalgar

Square is connected with the Bank by the Strand, Fleet Street, Ludgate Hill, Cannon Street, and Queen Victoria Street, this line forming the base of the triangle ; from the opposite apex, St. George's Circus, five streets spread out in a fan, rejoining this base by crossing the Thames by five great bridges—London Bridge, Southwark, Blackfriars, Waterloo, and Westminster. From each of these three groups of cross-roads radiating streets intersect the town in every direction. To the Trafalgar Square group are attached Regent Street, leading to Regent's Park, Piccadilly to Hyde Park, the Mall, forming the state avenue to Buckingham Palace, Whitehall leading to the Houses of Parliament and Westminster Abbey, &c. The great commercial arteries radiate from the Bank, which, with the Mansion House and Exchange, forms the centre of financial operations. St. George's Circus disperses southwards the third group or network of streets, consisting of five principal thoroughfares which extend through the industrial quarters of south London. The *ensemble* of the plan seems to consist of twisted, tangled streets, among which a straight street is a rare exception, like a network of string with three principal knots. But, gently pull these distended lines, straighten them out in their right directions, and the plan becomes clearer, and can be broadly interpreted by the theoretical scheme in Fig. 43.

Every year for many years past a number of new streets have been provided in London, giving a temporary benefit, the effect of which seems to quickly

disappear. Important works like the Holborn Viaduct, Queen Victoria Street, Victoria Embankment, Shaftesbury Avenue, Charing Cross Road, Clerkenwell Road, Rosebery Avenue, the Tower Bridge, the widening and extension of Eastcheap to Tower Hill, have all done

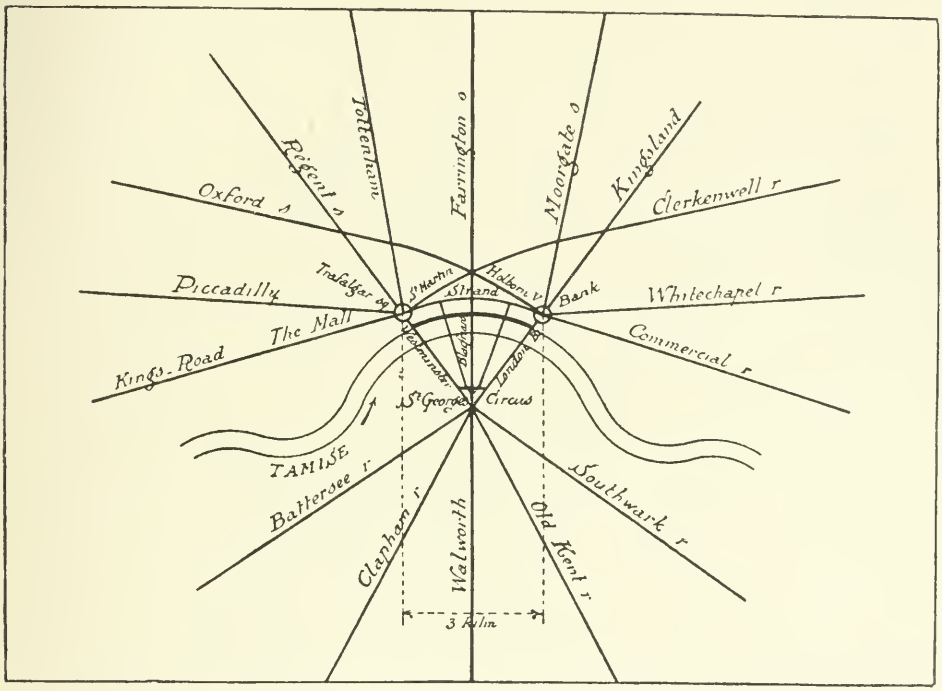


FIG. 43.—THEORETICAL PLAN OF THE TRAFFIC CIRCULATION OF LONDON

something, but in spite of these and many other improvements we still have the tremendous congestion of traffic.[1]

The congestion of street traffic is principally due

[1] An idea of the enormous number and cost of these improvements can be gathered from Mr. Percy J. Edwards's "History of London Street Improvements, 1855–1897," published by the London County Council.

to the mixture of slow-going and quick-going traffic. The varying speed of the different kinds of vehicles is very marked and highly dangerous. The number of fatal accidents in London in 1907—the last year for which official statistics are available—was 283, as compared with 212 in 1906 and 172 in 1905, and the number of accidents by which people were injured was 16,772, as compared with 14,060 in 1906 and 11,688 in 1905.[1] This alarming increase in accidents synchronises with the advent and increase of motor traffic. A variety of vehicles moving in a variety of directions at a variety of speeds renders it at many important centres of traffic in London impossible for anyone to calculate the chances of a safe crossing save by the arithmetic of agility.

Addressing a meeting some few years since on the subject of London traffic, the late Mr. Thomas Blashill, architect to the London County Council, said that with regard to moving vehicles, or such as were supposed to be on the move, we had arrived at a time when new conditions must enter into any consideration of the future. A motor cab obstructs little more than two-thirds of the length of cab and horse, and so with the motor victoria and landau and omnibus and tradesman's cart and van. When these vehicles became so numerous as to dominate the traffic, the speed of all vehicles using principal streets would be fixed at a rate uniformly high, and all slower vehicles would be turned into side streets.

[1] *Daily Telegraph*, March 16, 1909.

THREE-BRANCH CROSSWAY

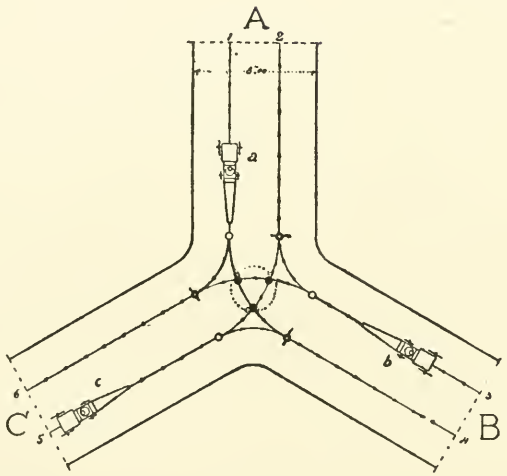


FIG. 44

○ 3 points of deviation from line of traffic
ϕ 3 points of junction with line of traffic
● 3 collision points

FOUR-BRANCH CROSSWAY

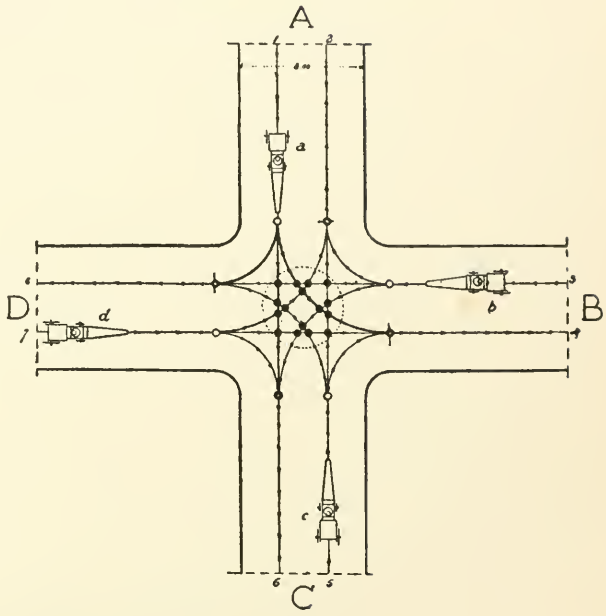


FIG. 45

○ 4 points of deviation from line of traffic
ϕ 4 points of junction with line of traffic
● 16 collision points

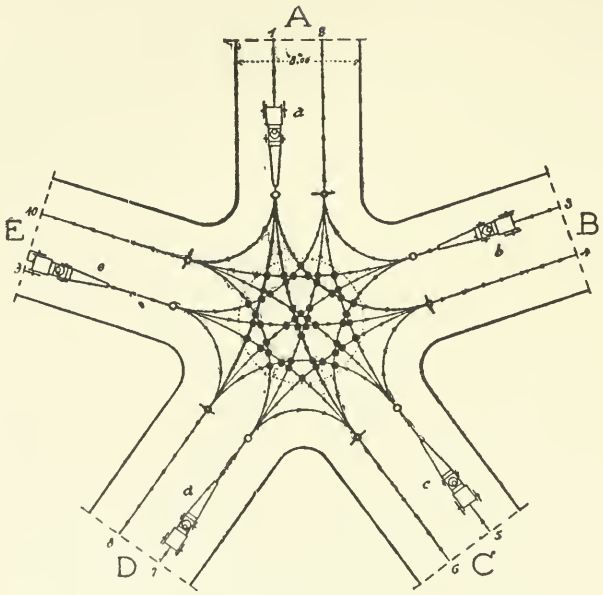


FIG. 46

○ 5 points of deviation from line of traffic
ϕ 5 points of junction with line of traffic
● 50 collision points

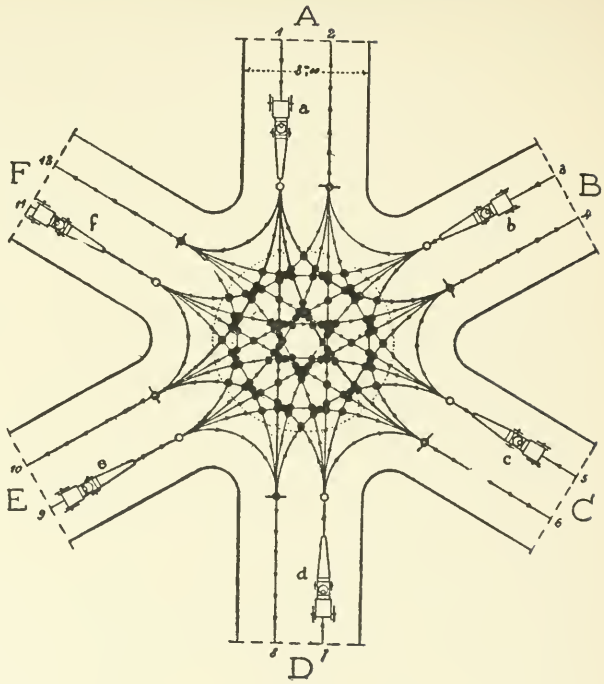


FIG. 47

○ 6 points of deviation from line of traffic
ϕ 6 points of junction with line of traffic
● 120 collision points

There are very few roads which, except at crossings, would be insufficient for their traffic were it not for the mixture of slow with quick traffic. If every vehicle were now decreased in length by one-third, the capacity of every street would be practically increased in nearly that proportion. There would be no struggle to pass, as the need for one vehicle to pass another was due to the difference in the pace of horses and the difference in the weight of their loads. With motor traction, light and heavy traffic, subject to a few exceptional loads, would go at the same rate and use the same track. In London we are not concerned with streets of ample width, where quick traffic could go its own pace, but with crowded streets where even the quickest traffic went not faster than an average of six miles an hour, and probably not faster than four miles, while the slow traffic went rather under three miles an hour.

One solution, then, of the traffic problem seems to be to attempt to divide the varying speeds into groups, by making provision for the separation of the slow and quick traffic and strictly confining them to distinct channels of progress, and to abolish the present system of indiscriminate stopping by providing a large number of compulsory halting places. The first requirement would of course be applied to all kinds of vehicular traffic. The second would perhaps only be practicable with the motor omnibuses, which would thereby be put on the same footing as the electric tramways. In the chapter dealing with

streets we shall see that these are the methods being everywhere followed in new streets in Germany and France. But although the congestion of traffic in main thoroughfares is largely caused by the mixture of slow and fast draught and the narrowness of the streets, that which forces itself most into prominence is the obstruction caused by the continual stoppages at the crossings of important thoroughfares.[1] Traffic is thus compelled to proceed in a series of small groups, with intervals between, when the roads are comparatively clear.

The effect of three, four, five, and six streets meeting at one point is shown in Figs. 44 to 47.[2] Fig. 44 is a plan of the meeting of three streets, from which it will be seen that there are six possible routes for vehicles, AB, AC, BA, BC, and CA, CB. There are three possible points of collision in these trajectories, *i.e.*, there are three points where, if two vehicles approach at the same time, one must slow up or stop in order to avoid collision. In Fig. 45 four roads are shown meeting at one point, which allows of twelve different traffic routes and produces 16 points of collision. Fig. 46 shows the junction of five streets,

[1] In order to test the seriousness of this evil a report was made to the London County Council of the loss of time and money at one of the London crossings, at the junction of Wellington Street and the Strand, and it was reported that during two days, from 8 a.m. to 8 p.m., no less than 6,341 vehicles out of a total of 19,724, or about one-third, were held up, and that the lowest possible estimate of the loss of time involved amounted to £7,180 per annum.

[2] From diagrams kindly lent by M. Eugène Hénard.

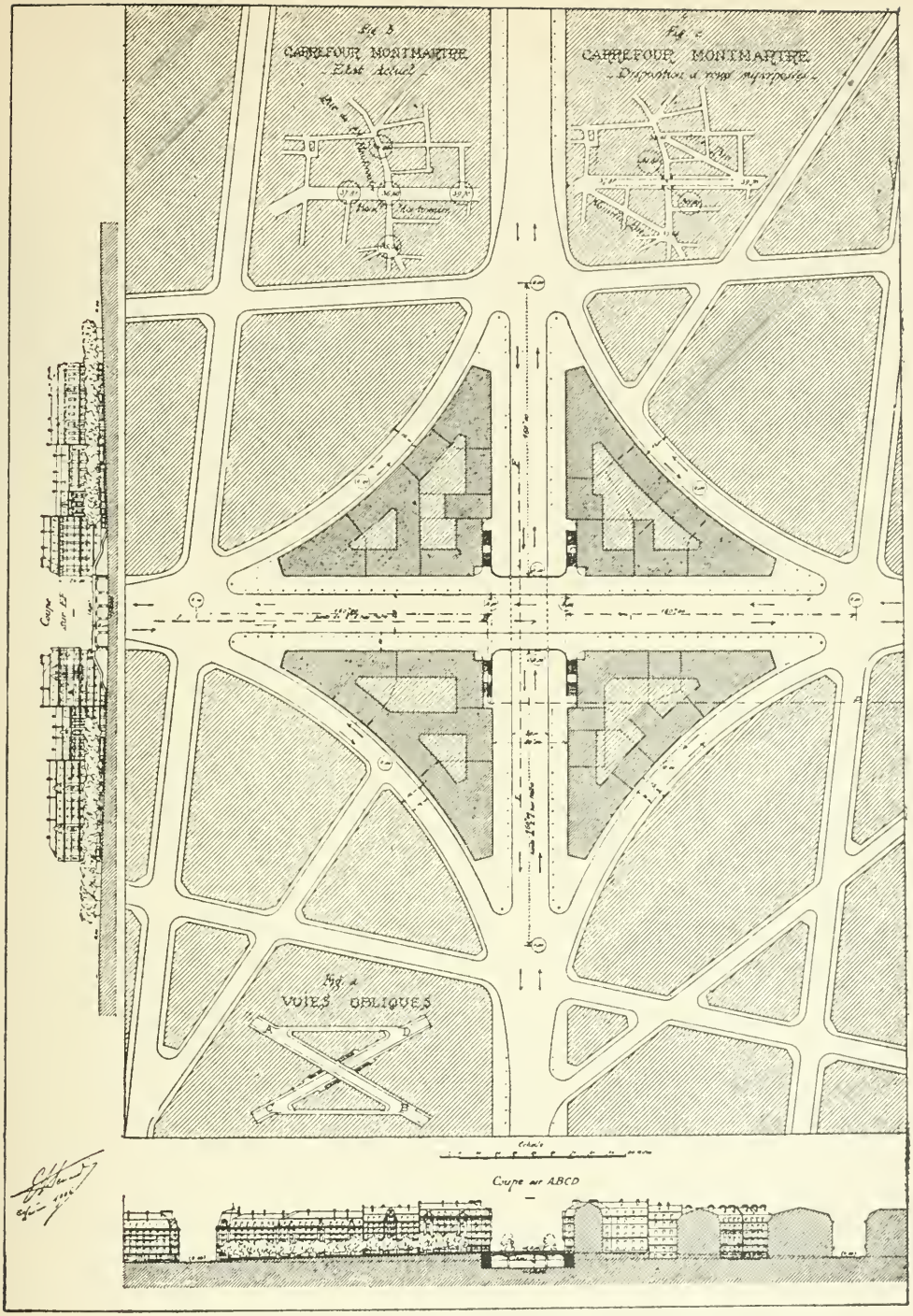


FIG. 48.—PLAN OF A SUPERIMPOSED THOROUGHFARE BY M. EUGÈNE HÉNARD

which gives no fewer than 50 collision points; and again by the addition of one more street, as in Fig. 47, we find a total of 120 actual collision points.

When we study large street crossings of four ways, which are, of course, those most frequently to be met with, one of the first ideas that naturally will occur is that, as all the trouble is caused by two currents of traffic meeting, why not superimpose one above the other? Such a system already exists at the Holborn Viaduct, and a similar scheme was suggested by Mr. Paul Waterhouse in dealing with the point of juncture of the two great traffic avenues which the Traffic Commission proposed should be taken across London.

In such a scheme of superimposed thoroughfares upon a level site a gradient of 1 in 30 is the steepest which is admissible, the minimum safe headway for a bridge is 16 feet, and the depth of girder required would add another 2 feet 6 inches, so that the lower roadways, supposing one road descended and the other ascended, would have to be sloped for a distance of about 100 yards on either side.

M. Eugène Hénard[1] has published an interesting study for such a contrivance in the heart of a great city. Let us suppose that two important thoroughfares, each 130 feet in width, cross each other in the midst of a thickly populated city. In order that there shall be no encumbrance to the traffic, M. Hénard

[1] "Études sur les Transformations de Paris," Fascicule 7, par Eug. Hénard, Paris, 1906.

proposes that a height of at least 26 feet between the two levels be allowed for, leaving a clear height of about 23 feet. By allowing an easy gradient of $2\frac{1}{2}$ per cent. both the upward and downward ramps would have to be about 520 feet in length (Fig. 48). In order to allow traffic to pass from one thoroughfare to the other it would be necessary to connect them by four curved roadways, which would be on the level as shown in the bird's-eye view (Fig. 49).

In the case of thoroughfares crossing one another in an oblique direction it would be possible to connect them as shown by the small diagram (Fig. 48*a*) by short roads AD and CB. In either case it is essential to provide subsidiary stairways for pedestrians. One advantage of this arrangement is that pedestrians from either side of the two thoroughfares are not obliged to cross any line of traffic.

The disadvantage of superimposed thoroughfares is that they necessitate extensive alterations in the adjoining buildings, adding considerably to the cost of the improvement; they force pedestrians who are passing from the lower to the upper thoroughfares to ascend flights of steps; finally, they have the irreparable defect of not being a general solution, and are inapplicable to crossways of five or six roads. So that superimposed roadways can only be regarded as practical solutions for cross thoroughfares where, as at Holborn Viaduct, the topographical conditions are favourable.

A more practical solution of the problem of crossways is supplied by the gyratory method of street

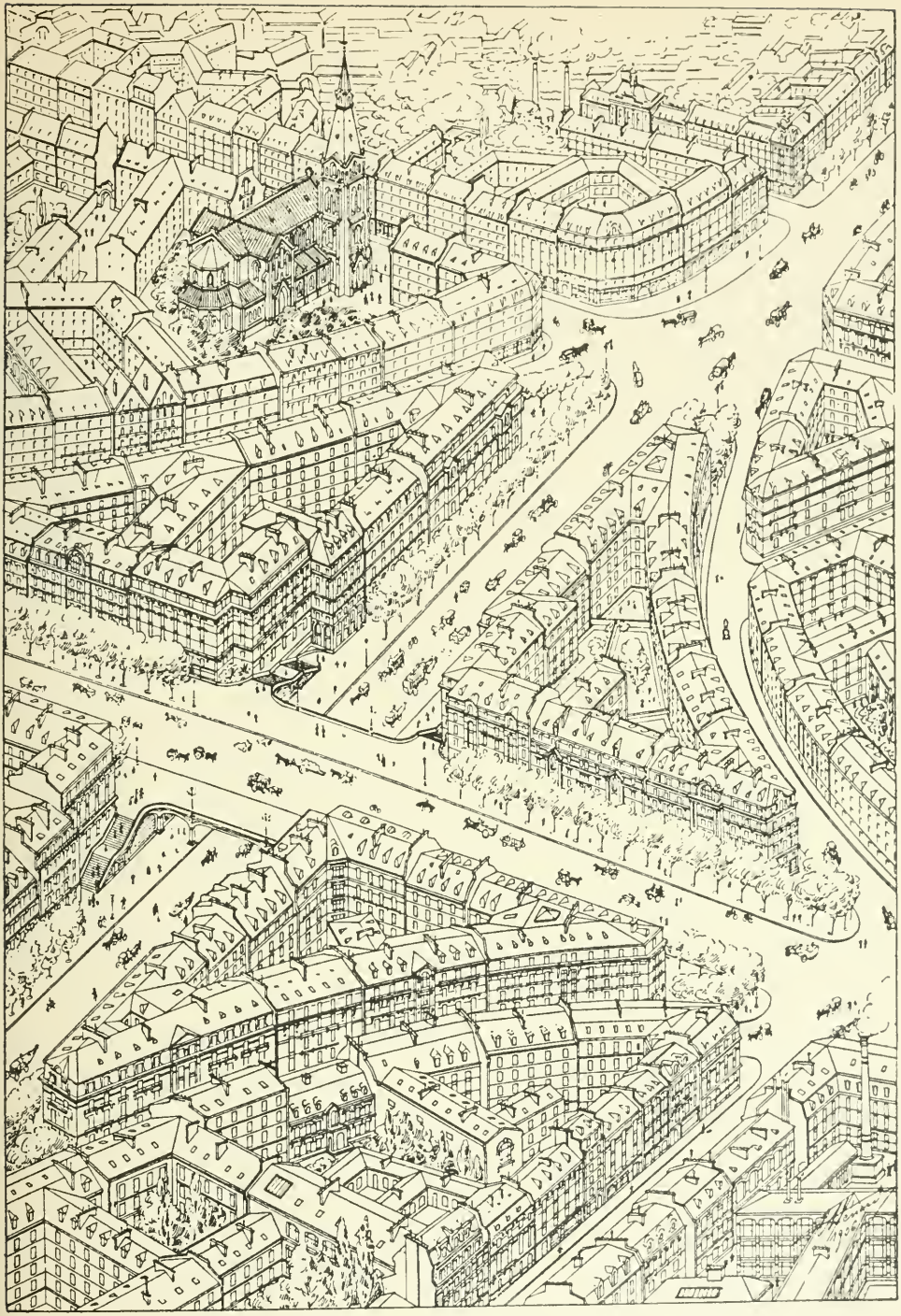


FIG. 49.—BIRD'S-EYE VIEW OF M. EUGÈNE HÉNARD'S DESIGN FOR A SUPERIMPOSED THOROUGHFARE

crossings. In the sketches already given we have traced all the collision points in the usual types of crossways, and the plans clearly show that, whatever the number of intersecting streets, all the points of collision are contained within a circle forming the centre part of the crossroads. Let us for a moment see if it would not be possible to obviate these collision points by placing obstacles in the centre. At first sight the solution appears absurd, because it would seem to impede the circulation itself by simply displacing the collision points, but on closer examination it will be seen that the placing of an obstacle on the central danger area would force traffic to go round the obstacle and thereby its course would nearly follow concentric lines, forming tangents to the circle. It only remains to avoid antagonistic movements, and in order to make the solution completely satisfactory, to compel traffic always to turn in the same direction and only to enter the congested area tangentially and at an angle of not more than 45°. In such a system all collision points disappear. The solution is a good general one because it is independent of the number of intersecting thoroughfares.

The system of gyratory traffic regulation was first proposed by Mr. Holroyd Smith some few years ago, and its application to London's crowded traffic places has been strongly advocated by Mr. W. N. Twelvetrees [1] :—

[1] Presidential Address to the Civic and Mechanical Engineers' Society, October 3, 1907.

"To illustrate the system of gyratory traffic movement, let us take the case of a junction such as that shown in Fig. 50, where four streets converge upon an area sufficient to permit continuous locomotion. To avoid unnecessary complication, only one line of traffic in each direction is considered in each street, and the drivers of vehicles are assumed to take the shortest cut to every possible destination. The result

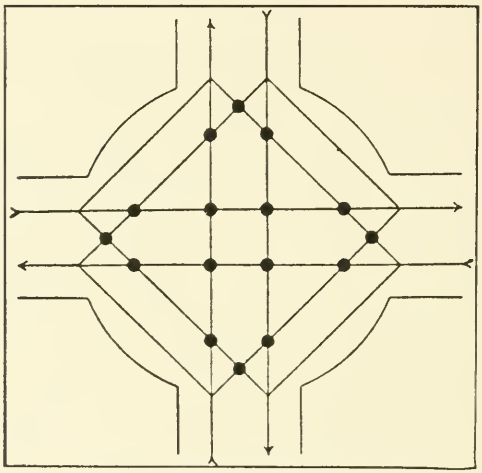


FIG. 50.—TYPICAL CIRCUS

is sixteen points of conflict, leading to hopeless confusion, the only lines free from intersections being those along the outside. A little reflection will show that if vehicles were prevented from penetrating into the central area, where conflict is so pronounced, and were compelled to follow a circular line, there could be no points of intersection. On the contrary, there would be a gyratory procession, receiving and dis-

tributing traffic along tangential curves at each of the four branches.

"Fig. 51 shows the same hypothetical junction with gyratory traffic regulation, absolutely obviating all points of conflict and reducing the number of converging and diverging lines from twenty-four to sixteen. At the centre of the junction is a circular refuge, and at the mouth of each street a refuge,

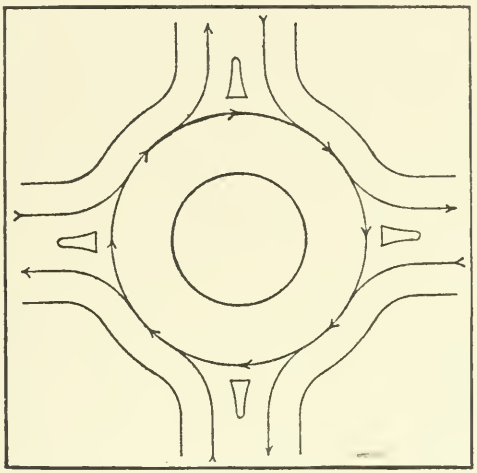


FIG. 51.—TYPICAL CIRCUS WITH GYRATORY REGULATION

whose sides should be curved sufficiently to act as a training wall, guiding the flow of traffic in the required directions.

"It must be admitted that a certain amount of intersection must necessarily result from the establishment of concentric circles of gyratory movement. But the difficulty is more apparent than real, because drivers in the outer circle would very frequently desire to break away tangentially at the same moment as

other drivers in the inner circle. Similarly it may be assumed that arrivals and departures at the several points would be fairly equally balanced, so that the gaps formed in the line would facilitate the entry of newly arriving vehicles. Any slight drawbacks that might attend the adoption of the gyratory system would certainly be more than counterbalanced by the

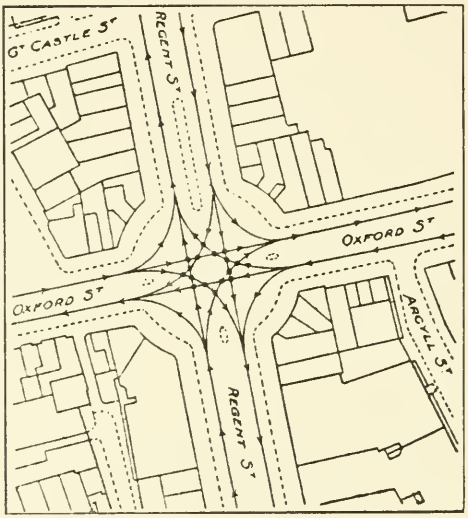


FIG. 52.—OXFORD CIRCUS, LONDON

avoidance of confusion, stoppages, and delays; by the additional safety assured to foot passengers, for whom subways should be provided; and by the far smaller number of police officers required for the purposes of regulation.

"In London we have ready at hand several spacious junctions where the gyratory system could be applied very easily. One of these is Oxford Circus, the present arrangement of which is given in Fig. 52.

On this plan are drawn curved and straight lines, indicating the various directions for single files of traffic. These lines give sixteen points of direct conflict, but it will be seen that all these points come within a relatively small area in the middle of the circus. Outside the area of conflict there are no points of intersection, and it is very evident that by

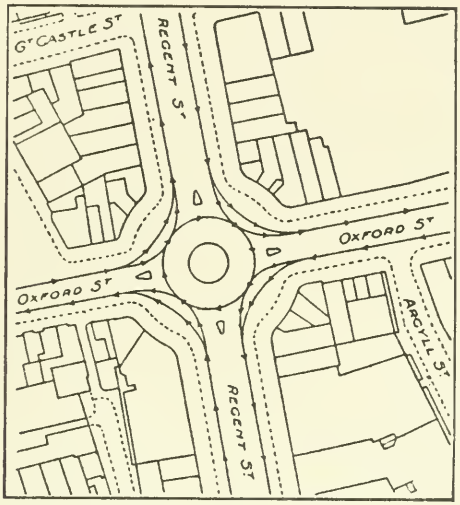


FIG. 53.—OXFORD CIRCUS WITH GYRATORY REGULATION

describing a circle connecting the outermost traffic lines we have at once an indication of the rational course for vehicles desiring to pass from any street to any other street.

"Fig. 53 is a revised plan of Oxford Circus, showing the total abolition of conflicting points and the reduction of converging and diverging lines resulting from the gyratory regulation of vehicular traffic. Four additional curves are here drawn to illustrate the

manner in which vehicles can pass directly from every street to the next street on the left hand without the necessity for entering the main stream of traffic moving round the circus.

"As a typical example of the manner in which open spaces have been created at immense cost, but with comparatively little benefit, a plan of Piccadilly

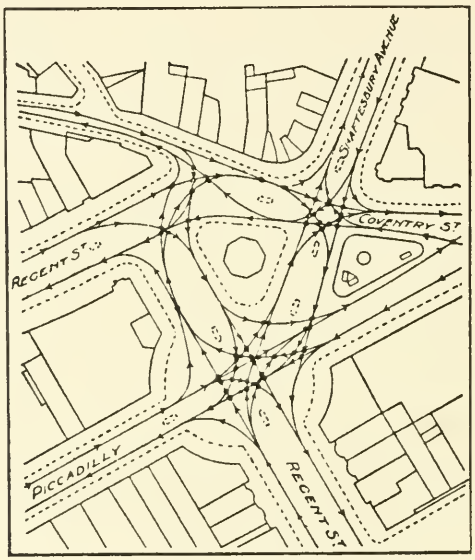


FIG. 54.—PICCADILLY CIRCUS, LONDON

Circus in its present enlarged form is given in Fig. 54. The additional area to the north actually doubles the number of natural intersecting points in the original circus, as demonstrated by the thirty points of direct conflict. At the Quadrant end of Regent Street there are eleven points of intersection, and at the end of Shaftesbury Avenue there are fifteen similar intersections. Thus, in spite of the magnificent area

provided by recent street improvements, we have a total of fifty-six points where traffic lines are in conflict.

"Although the increased space has failed in the object of avoiding congestion at the most undesirable points, it is interesting to find that the left-hand triangular refuge actually has the effect of compelling some of the traffic lines to follow an approximately circular course. This result confirms the principle

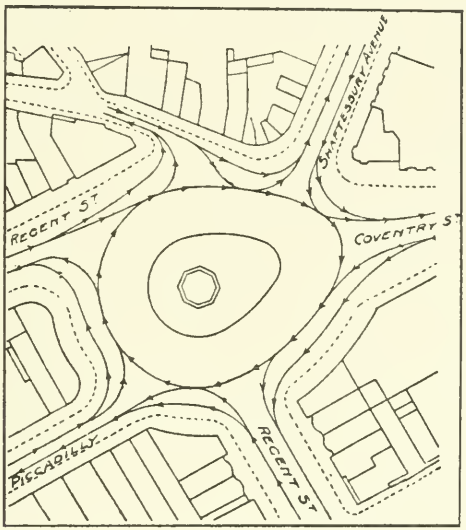


FIG. 55.—PICCADILLY CIRCUS WITH GYRATORY REGULATION

already suggested, that the rational method of obviating conflict is to place suitable obstructions upon areas where confusion naturally tends to occur, and then to make all vehicles pass around the obstacles so created.

"To deal with Piccadilly Circus in its present form is not an altogether easy task. The existing state of chaos might be reduced to order by establishing two systems of rotation, one in the new area and

the other in the original circus. Such a plan would obviate the necessity for structural work other than the modification of the two triangular refuges, the construction of a central plateau in the original circus, and the addition of guide refuges at the mouths of the various streets. But to make the best of this fine space, the sides of the original circus require to be opened out as suggested in Fig. 55. To do this we should have to cut off a small slice from the Criterion corner and to cut back the well-known drapery establishment at the corner of Piccadilly and Regent Street. Then the way would be clear for an egg-shaped circuit, dispensing with all intersection of traffic, and giving a splendid site for the joint station of the Baker Street and Waterloo and the Piccadilly tubular railways. The centre of Piccadilly Circus is an ideal place for such a station, readily accessible from every side by a system of radiating subways. The neglect of this magnificent site is typical of the way in which things are muddled in London simply for want of a capable administrative body having power to deal with all phases of the traffic problem."

Whilst these gyratory crossways are distinctly favourable to vehicular traffic they are somewhat detrimental to pedestrians, and where adopted on any large scale, it would certainly be necessary to provide means for pedestrians to cross by underground passages, which might lead to a circular area open in the centre. If no more than 8 feet in height only a few steps would be necessary.

But perhaps a more practical means of relieving congested traffic is by the planning of duplicate parallel roadways connected with each other at intervals. It often happens that a secondary street runs more or less parallel to an important thoroughfare, and when this is the case it may be a not very difficult matter to connect the two by means of several crossroads and arcades, and possibly at the same time widening the smaller street here and there. The idea has been successfully carried out in Paris, where the Boulevard Sébastopol is thus relieved by the Rue St. Martin, and might very well be imitated in London, where many opportunities for putting it into practice will occur.

Another means that has been already adopted for relieving the pressure of traffic is by a system of underground freight subways to establish communication for the transport of goods between docks, markets, and railway termini and the warehouses and business premises. By this means a very considerable proportion of the total goods traffic of a city could be conducted without using the public streets. These tubes should be sufficiently large to admit the ordinary rolling stock used by railway companies, so that entire wagon-loads of goods could be transferred to the underground lines by means of lifts without transhipment at goods depôts.

In Chicago the Illinois Tunnel Company now own and operate upwards of sixty miles of underground freight tunnels in the business part of the city. The

idea was first suggested by the system of underground tunnels in a coal mine, and the immense undertaking is due to the initiative of Mr. A. G. Wheeler. The tunnels are constructed under all the streets in what is known as the "business" centre of Chicago. At each street corner there are what are termed four-way intersections; these, with the sidings in front of business houses, are like sidings to a railroad. Most of the sixty miles of tunnels are 6 feet wide and 7 feet 6 inches high, the roof forming an arch. The main or trunk tunnels are 12 feet high and from 12 feet to 14 feet wide, thus allowing ample height for a man to work in comfortably and space to allow for the future growth of the system. The authorities stipulated that the tunnels were to be about 40 feet under ground, and this plan has been followed, so that the tops of the tunnels are about 33 feet below the level of the street and thus avoid cutting into the sewers, water and other pipes, and at the same time leave ample room above the tops of the tunnels for the construction of a subway system for the street car traffic of the city in case it should ever be decided to construct such a system. The Illinois Tunnel Company are prohibited by their charter from ever carrying passengers through their tunnels.

It is said that there is more freight hauled through the streets of Chicago than in any other city in America. New York hauls about 75,000 tons of freight daily through its streets, Philadelphia and

Boston about 65,000 tons each, and Chicago 100,000 tons a day, and it is expected that the Company will eventually haul about one-third of this enormous amount. The Company makes the necessary shaft connection between the tunnels and a warehouse, and

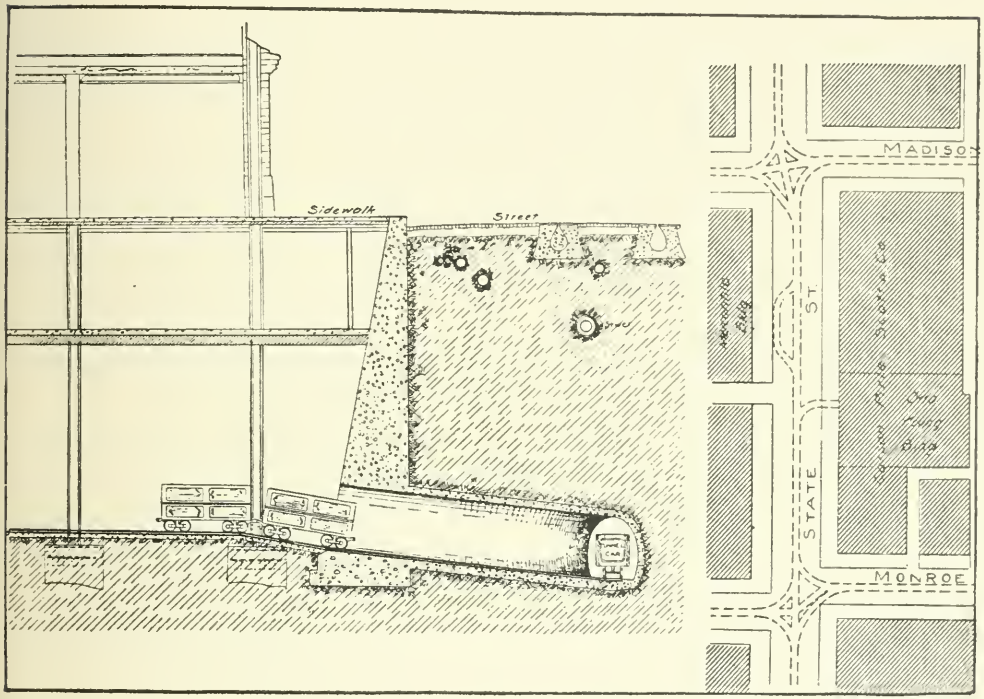


FIG. 56.—PLAN AND SECTION SHOWING A TYPICAL CONNECTION OF THE ILLINOIS TUNNEL COMPANY TO A WAREHOUSE BUILDING

the equipment of such a shaft with lifts, &c., capable of handling freight costs about £4,000. The tunnel cars have a capacity of about three tons each, and after being hauled to the foot of the lifts, they can be elevated directly into the building to be served.

Thus in the big warehouse of Messrs. Marshall,

Field & Co., on the west side of the river, the cars are hoisted to any desired floor and unloaded. The tunnel trains run into the basement of the building and stop beside a long concrete platform which is the height of the floor of the tunnel cars. At the back of the concrete platform are the store elevators; small trucks on wheels are filled at the warehouse (which has a similar connection), placed on each tunnel car, unloaded on the platform of the retail store, and then elevated to any floor of the building, where they are pushed by hand to the counter desired. For shipments from the warehouses, empty cars are delivered and returned to the tunnel loaded in the same manner. Of course, direct communication between tunnel and warehouse is not always possible, and to obviate this the tunnels have central depôts at various points in the city. In some cases connections with warehouses are made by lowering the basement of a building 40 feet from the surface, or on a level with the tunnels, which enables the cars to run in on the level.

Another important work of the tunnels is the hauling away of rubbish and material from the excavations of new buildings. There is not a big building that has been erected in Chicago since the system has been in operation for which the tunnels have not been used for hauling away the excavated material. A steel chute is simply run up from the tunnel to the excavation about 3 feet in diameter. This chute is on an angle of about 45°. The workmen bring their barrows

of material to the mouth of the chute and dump them; gravity carries the soil to the bottom, where it falls into the waiting car. One car filled, another is moved under the mouth of the chute, and when a train has thus been made up, the electric locomotive hauls it away. All this means a very considerable gain in time for the contractors.

The largest customers of the Tunnel Company are the postal authorities, who have entered into contracts for the transport of mails, and the Company is to-day doing a work which would otherwise employ hundreds of mail carts on the streets. The tunnels are connected with the goods termini of every railroad entering the city, and each railroad has its own system of freight houses, all of which are also connected.

Another source of large revenue to the Company is the disposal of rubbish, ashes, excavation soil, and all kinds of refuse which can be easily collected from the basements of buildings and transported quickly to the lake or to the outskirts of the city.

In London a step in the right direction has been taken by the formation of the new thoroughfare from Holborn to the Strand, where a tramway has been constructed below the level of the roadway by means of a tube, so that a large amount of traffic is diverted from the road above. This is the first attempt in England to deal with the congestion of traffic by means of tunnels, but the principle might be applied to tramway systems with great advantage where it is necessary for them to pass through congested areas.

Under the garden of the Quirinal in Rome a traffic tunnel has been constructed nearly a quarter of a mile in length, providing for the traffic between two parts of the city. It has a very good appearance, being lined with glazed bricks and tiles and lighted by electricity and gas.

According to the Royal Commission on London Traffic the construction of tramway subways in existing cities is a very costly business, amounting in some specific localities to as much as a million pounds per mile, and rarely lower than £300,000, even where more favourable conditions exist, so that where the choice lies between subways and street widening it will generally be found nearly as cheap to widen the streets and lay tramways on the surface. In any case the construction of such subways must be a question of relative cost, with the additional consideration that travelling on the surface is always preferable and a wide street always has an advantage.

In addition to these main subways, considerable relief to street traffic could be afforded by the construction everywhere of subways for water, gas, and other mains, similar to those which exist in many of the streets of Paris. This would prevent the continual obstruction caused by the roadways being taken up. Such subways would contain the sewers and drains, water and gas pipes, pipes for hydraulic power, wires for electric lighting, telegraphs, and telephones, and perhaps in time, mains for a public supply of steam for heating and ventilating or driving

machinery. Although it is hardly practicable for such subways to be constructed through the present congested areas, it is still quite possible to make provision for them in laying out or replanning thoroughfares that are to pass through the congested areas of the future.

A third kind of subway is the underground pedestrian passage that has been already adopted in several congested points of London and Paris. Such a system, however, has yet to be proved a success, and probably will only be so in large traffic places. The London Traffic Commissioners reported that, however convenient they may be in theory, these subways do not seem to be much used when provided, as apparently the mere fact of having to go down a stair keeps the majority of people on the surface. If inclined planes could be provided instead of steps they would probably be more used.

CHAPTER IV

TOWN EXPANSION

IT has been justly said that the greatest municipal mistake of the nineteenth century was the treatment of, or rather the neglect to treat, the suburban areas that have arisen with such startling rapidity round all the great cities. In this respect no country has been more neglectful than England. Whilst most of the great cities in Europe have made serious efforts to deal in a comprehensive way with the planning of their suburbs, London has stood still, and except for occasionally appointing a commission of inquiry has done practically nothing.

In the seventeenth century John Evelyn recommended that, in the rebuilding of London after the Great Fire, the original city should be preserved by allowing no suburbs to be started within a circuit of ten miles. It was, of course, a Utopian idea, and with the transport facilities of those days quite impossible of achievement, but the principle might well be carried

out where it is desired that a city should preserve its old-world characteristics.[1]

Before the nineteenth century was half over the surroundings of London were entirely spoiled, and the once pleasant villages which had stood sentinel round it for ages were reached and soon engulfed by the sea of houses which now constitutes Greater London. Although space for public parks was adequately provided, it was not considered necessary in any way to restrain the speculative builder from laying out street after street of villa residences all on a dead level of degrading ugliness. Other large cities have fared no better. Liverpool, Glasgow, Manchester and Birmingham, all have allowed their suburban areas to fall a prey to the speculative builder. New suburbs have been created without method or plan and for the most part without any expert supervision. Country lanes, open fields, private parks, pleasure grounds and gardens are everywhere giving place to rows of dreary streets. Hedges, trees, and fields are ruthlessly destroyed with the sole object of crowding the maximum number of houses on to the minimum area of land. All round our larger cities, and even in semi-rural districts where land is cheap, the builder has been allowed to run up long rows of barrack-like structures, consisting of two walls covered with a roof

[1] The idea has been carried out to a certain extent at Nüremberg, which in spite of its great increase in population, now amounting to over a quarter of a million, and of its being the most important commercial and manufacturing town in Southern Germany, has retained its mediæval appearance, together with its old ring of fortification.

and divided at regular intervals into compartments which are supposed to be, or at any rate are termed, houses. It is true that we occasionally find some group of detached or semi-detached villas that bears trace of architectural design, but these are mere oases in the rapidly growing desert.

The London suburbs are becoming a source of considerable danger. Although the houses are smaller and the population is spread over a much greater area than in most continental cities, they are so closely packed with unhealthy subjects, and their chimneys emit so much smoke, that the atmosphere is becoming denser and more impure every succeeding year, and should a serious epidemic occur the spread of contagion to the great centre and again outwards seems inevitable.

Population is still increasing within the area of Greater London, and according to the estimate of the Metropolitan Water Board, by 1960 the population will have increased to the gigantic figure of 16¼ millions. Let us hope that before we reach this point a reaction will have set in against such overcrowding. London is already too vast to live in or to manage, but in all probability the difficulties engendered will to some extent be solved, as other smaller towns arise and take away many of the factories. Signs that these difficulties may work their own cure can be seen in the desire to form garden cities and to move factories and workshops to country sites. The probable increase in the number and speed of methods of locomotion is

likely to encourage this tendency to decentralisation.

Although we fear it is too late for any general scheme of suburban expansion upon a large scale to be adopted in London, it is at any rate possible to ensure each new locality being laid out with connecting thoroughfares, and if in the past the suburbs have been planned without method, we may yet prevent new evils from being added to the old. But it is of paramount importance that the lesson of London shall not be lost on our large provincial cities, who may well take up the idea of laying out their belt of suburbs on a comprehensive and well-considered plan.

In England much of the trouble has arisen from the fact that there are far too many small houses, and before we may hope for any great improvement in the planning of suburbs, as far as the working classes are concerned, it will be necessary to eliminate the old-fashioned idea of the English artisan class, who still insist on each small family having its own separate building. As these small houses are invariably let off into apartments, what appears on the surface to be a good arrangement in reality leads to much overcrowding. We would not, of course, advocate high blocks of several storeys of flats, but, without going to this extreme, a far more economical system of artisan dwellings can be devised than the row upon row of small squalid two-storied dwellings, with untidy and unhealthy back yards.

The whole question of the expansion of suburbs is a most serious one, and every large city should have a powerful permanent committee to deal with all questions of planning and extension as they may arise. The members should be representative of many different interests—of commerce, of hygiene, of traffic, and last, but by no means least, of the æsthetic aspect. They should together draw up a comprehensive plan in such a manner as to ensure that the newly built districts do not further choke the city instead of assisting its proper expansion. Much has already been done in America by such committees, who, although not holding any powers of compulsion, have always succeeded in exciting public interest in the question, and in stimulating a desire amongst residents to make their town more beautiful, more sanitary, and more fit for human beings to inhabit.

In Germany the idea that it is the duty of the authorities to guide the development of the suburbs is no new one. In 1876 Professor R. Baumeister, of Karlsruhe, published a book on "Stadt Erweiterungen" which is still regarded as a standard work on the planning of suburbs. For the last quarter of a century all large towns, and some of lesser size, have prepared plans to regulate the development of their suburbs. These town plans generally deal with the whole of the land within the town boundary, no matter to whom it belongs, and provide that all new thoroughfares shall be laid out with due regard to public convenience and hygiene, that there shall be

sufficient planted open spaces, and that some parts of the suburbs shall contain only detached and semi-detached houses. Everywhere we see the same far-sighted policy of looking to the needs of the future, or at least of the next twenty years, and anyone who has watched the systematic development of most German towns during the last quarter of a century must have been struck by the benefits accruing from the far-sighted principles that have been observed.

It is generally regarded as essential to good hygiene that buildings shall continuously diminish in closeness the further they are from the centre, so that fresh air may pass from the country into the interior of the town.

At the present time the city of Berlin, like London, is suffering from the want of a uniform plan of extension, and is confronted by the difficult problem of connecting the twenty-nine suburbs comprising Greater Berlin which have grown round it during the last twenty or thirty years, all of which have varying bye-laws. An effort is being made to arrange a voluntary agreement between the city and the suburban communes by which uniform action in matters of common concern may be secured. The Association of Berlin Architects has drawn up a scheme, which is now attracting much public attention, for the systematic laying out, as part of one plan, of an extensive area comprised within a radius of fifteen miles from the centre of the city, and including at least a hundred townships of all kinds.

It is proposed to make due provision for a network of streets and thoroughfares of width proportionate to their purpose, running into the outskirts and intersecting these in various directions, with special ways for motorists, cyclists, and equestrians, for new railway communications adjoining those already existing, for special residential and industrial districts, parks, recreation grounds, &c., and for sites to be reserved for public buildings. It may be that so ambitious a plan will not be carried out in its entirety, but the fact that it has been prepared by responsible men, and that it is the subject of serious discussion, indicates the trend of public thought.[1]

The building regulations for the suburbs of Berlin, as they now exist, limit the height of the buildings within reasonable bounds, and also the proportion of the site which may be covered. Different heights and different degrees of closeness are allowed in different districts. Thus in a few districts near the centre five storeys are allowed; in other large districts only detached or semi-detached houses not exceeding three storeys in height are permitted. On the west side of the town, the side from which the prevalent winds blow, a larger proportion of the area is reserved for open building than elsewhere.

In the 1908 Report of the London Traffic branch of the Board of Trade, Mr. W. H. Dawson has collected valuable information with regard to the

[1] See Report of the London Traffic branch of the Board of Trade, 1908, Appendix E.

municipal ownership of land in Germany. "German towns," he says, "are greatly assisted in dealing with traffic and housing difficulties owing to the fact that they generally own a considerable amount of land, both within the municipal area and outside, suitable for building purposes. This is an old tradition of municipal life in Germany which cannot be attributed to any special legislation, for it goes back to a period long antecedent to the existing system of communal government.

"Towns like Frankfort, Mannheim, Hanover, and Strasburg own from one-third to one-half of the entire municipal area, and nearly all important cities are possessed of a large and valuable real estate. As a consequence of this land policy, a German municipal authority generally has land of its own suitable for public works which it desires to take in hand, and it can determine, within certain limits, in what directions the town shall extend; by the steady increase in the value of its estate it shares with private owners in the material gain caused by municipal growth and development; and it is able to some extent to check land speculation."

The usual method in formulating town building plans on a large scale is to divide the urban area into building zones. Within the last few years the system has been applied to Cologne, where the whole city area is mapped out in zones, for each of which special building regulations are made. In the centre and business part of the city 25 per cent. of all

building land must be left free; in the second zone, immediately surrounding the central one, 35 per cent. must be left free, but buildings may have four storeys; in the third zone, if the building is

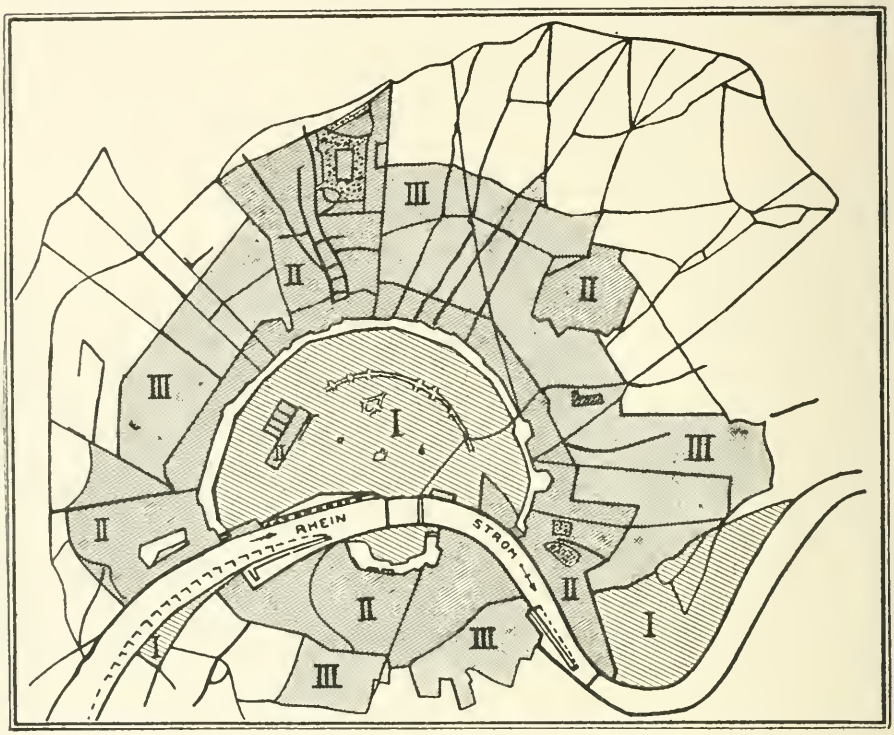


FIG. 57.—THE ZONE SYSTEM AT COLOGNE

I. The older part of the town, where the buildings are highest and very close together. III. Parts of the new town, where only lower buildings are permitted, with certain spaces between each. II. On these parts still lower buildings only are allowed, and greater space is required between the buildings.

not more than 30 feet high, 35 per cent. only need be free, if higher, 50 per cent.; in the fourth zone, which is the zone of villa residences, the buildings may be detached, with about 33 feet between each, with gardens in the front, and 50 per cent. of the site

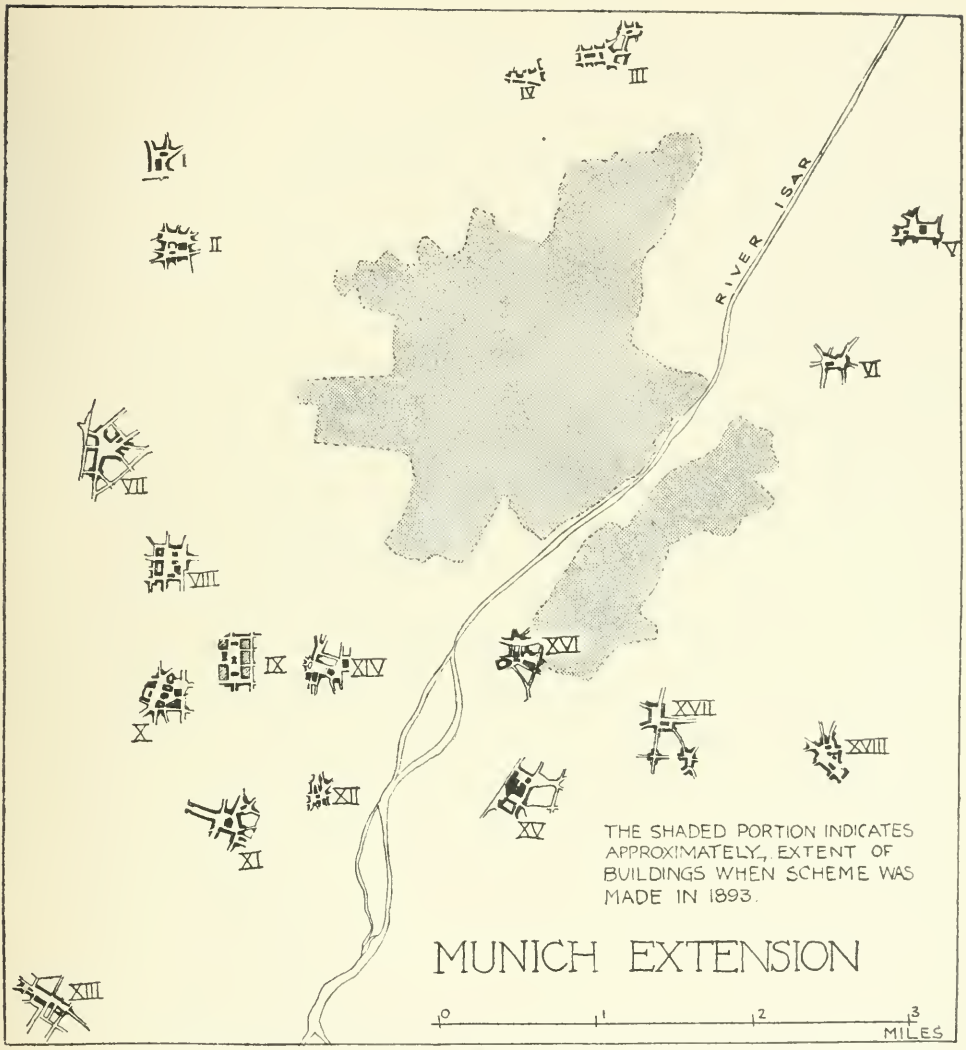


FIG. 58.—SUGGESTION FOR THE CREATION OF A SERIES OF EIGHTEEN CIVIC CENTRES ROUND MUNICH

must be left free. But this zone is not separate and apart, like the wealthier villa suburbs of an English city; it is cut up into sections and so interspersed between the second and the third zones that the dwellers in the poorer districts are always within reach of beautiful surroundings, and in touch with their richer neighbours. A large part of the municipal area of Cologne is as yet unbuilt upon, but for this part the same plans and regulations have been made and will come into force as soon as any building operations begin. The principle of dividing towns into zones is hardly likely to find favour in this country, and there is a good deal to be said against it. A more practical system appears to be that proposed by Herr K. Henrici for the extension of Munich, consisting of a series of eighteen supplemental centres, each with its little group of public buildings, church, market hall, and Rathaus, round which the plan of the neighbouring streets is designed. Figs. 58 and 59 show the general disposition of these centres, which it was proposed to create as far as possible round some existing building or centre of interest; existing villages were to remain undisturbed, and all the centres were to be connected by a network of thoroughfares.

Compulsory expropriation of land for purposes of town planning was recognised in Germany as early as 1845, when the Duchy of Saxe-Meiningen passed a law dealing with the subject. Probably the best system of expropriation is that of Baden, where, a building plan

having been prepared and a redivision of the various properties being considered necessary in the public interest, the whole of the properties to be redivided are pooled, including such public roads as will become superfluous by the rearrangement. Before the redistribution takes place, the land required for the new streets and places is set apart and apportioned to the commune. The rest of the area is divided amongst the various owners in the proportions in which they were originally interested. For every single piece of property which before the pooling was suitable for building, one or more building sites adjoining a street are to be returned to the owner, as far as practicable in the same situation as before.[1] It must be borne in mind that in Germany land is generally held by a larger number of proprietors per acre than in this country.

The enormous progress made in German trade in recent years has inaugurated a movement for the laying out of workmen's colonies throughout the country. Towns which up to the seventies lived in the quiet comfort of agriculture have in many cases grown by leaps and bounds into huge centres of industry. The problem of adequately housing the workmen is regarded as an urgent social necessity, and has in many cases led to the formation of distinct little colonies known as "Arbeiter-kolonien" in proximity to the factories. Such colonies are not necessarily provided by the employer; indeed, it is worthy of note that in Germany the idea of the employer providing house accommoda-

[1] See also Figs. 4 and 5, Chapter I

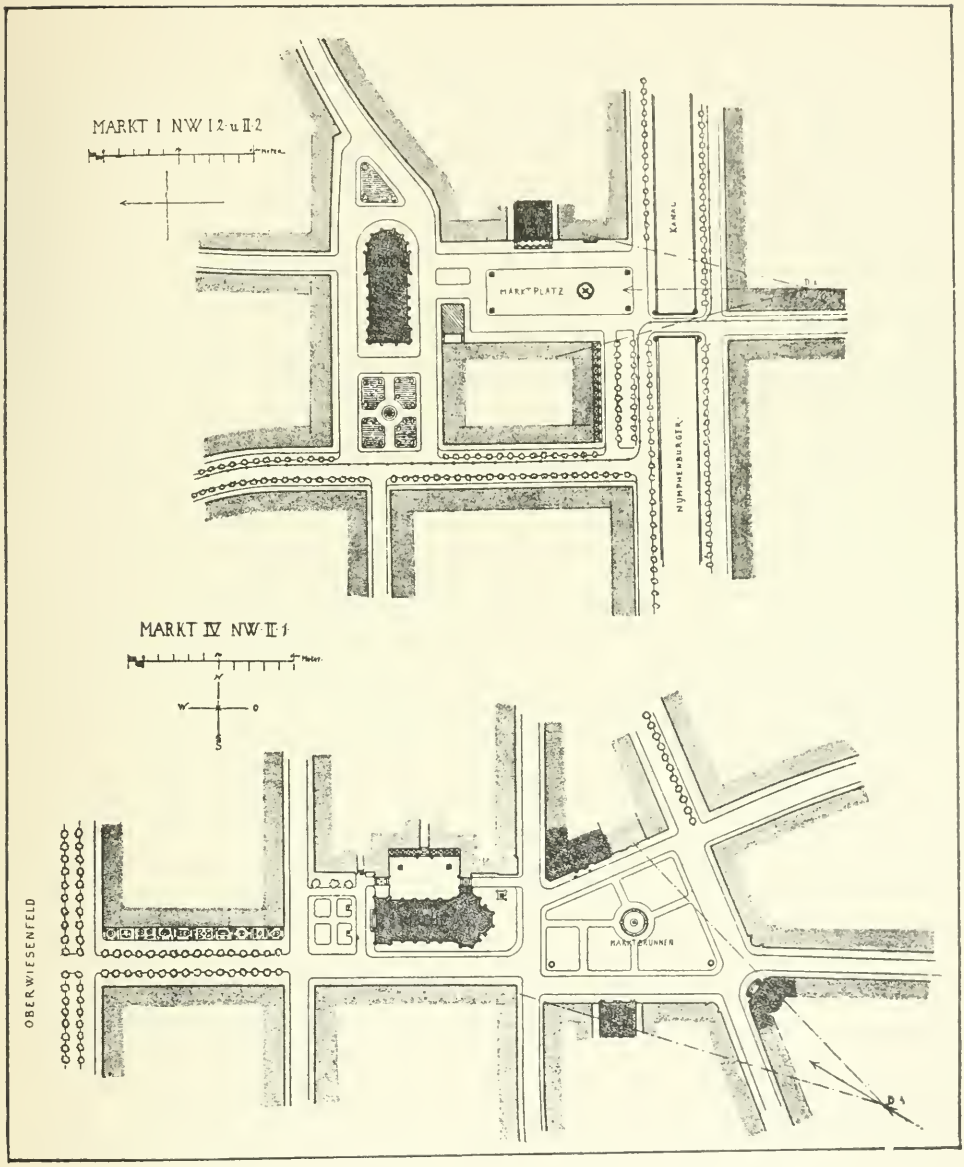


FIG. 59.—MUNICH EXTENSION: ENLARGED PLANS OF TWO CIVIC CENTRES

tion for the employee is not regarded with favour. It is found by experience that workmen who occupy the dwellings of their employers get into a condition of economic dependence which is often felt to be a considerable disadvantage. Where it has been possible to

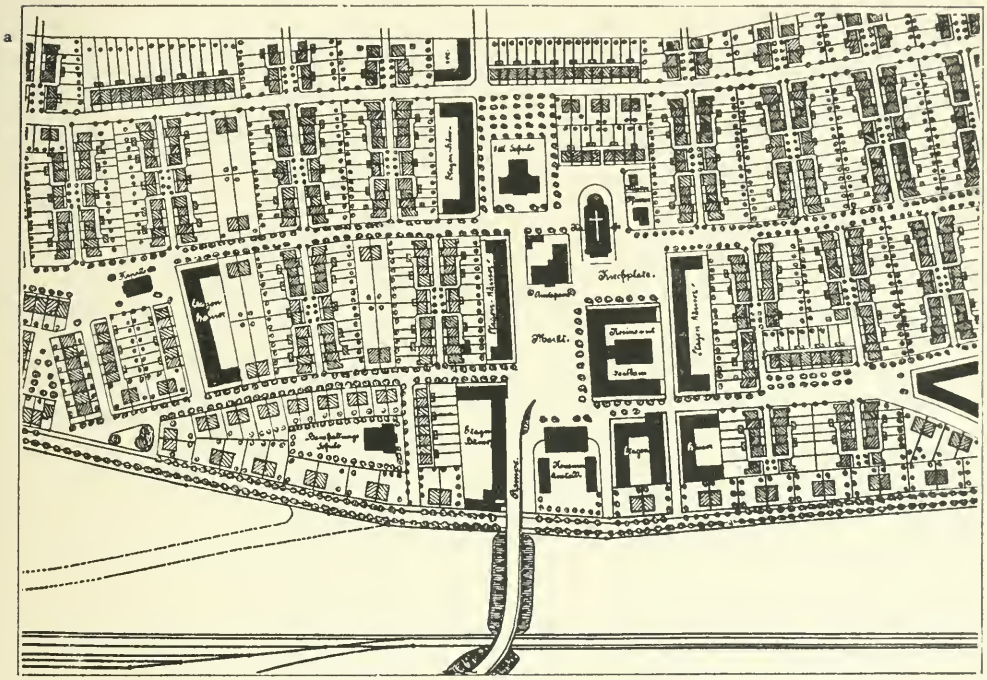


FIG. 60.—PLAN OF A WORKMEN'S COLONY AT KNUROW, DESIGNED BY HERR K. HENRICI, SHOWING THE PARALLEL SYSTEM OF ALLEY-WAYS

provide for such colonies in planning new parts of a city, they have generally been grouped together in a position decided by transport facilities. In some cases it is considered desirable to provide every family with a separate house, but this idea is not regarded as an essential feature of such colonies, and ample provision

is made for blocks of flats which are especially adapted for unmarried men.

In Germany the one-storied dwelling-house is not necessarily considered to be healthier than a tenement block, which with its extensive cellarage is often far drier. The houses in these "Arbeiter-kolonien" are generally planned in pairs or in rows, and as far as possible grouped. The picturesque small domestic architecture of the eighteenth century in which all old German towns are so rich is the type usually chosen for imitation.

A considerable economy is effected in the laying out of the secondary streets. These rarely exceed 16 feet, and, as in such colonies there is little vehicular traffic, the footways need only be wide enough to allow pedestrians to evade a vehicle when necessary. In the main thoroughfares or those along which traffic trains pass, the width is doubled or trebled, the police regulations[1] being sufficiently elastic to allow of varying widths. The result is a great saving of space and expense in road-making and upkeep.

A good arrangement of the dwelling-houses is that devised by Herr Henrici for the workmen's colony at the Government coal-mines of Knurow (Fig. 60), where a parallel system of alley-ways was planned. Not being intended for the use of vehicles, they form safe playgrounds for children, who are thus able to play out of harm's way under the supervision of their

[1] In Germany the regulation of town planning is in the hands of the police authorities.

mothers. These ways are broadened out in the middle into small spaces planted with trees, with perhaps a drinking fountain and a few seats. The alleys are about one hundred yards long, with ten to fourteen houses on either side. Variety is given to each alley by planting different kinds of trees and by varying the

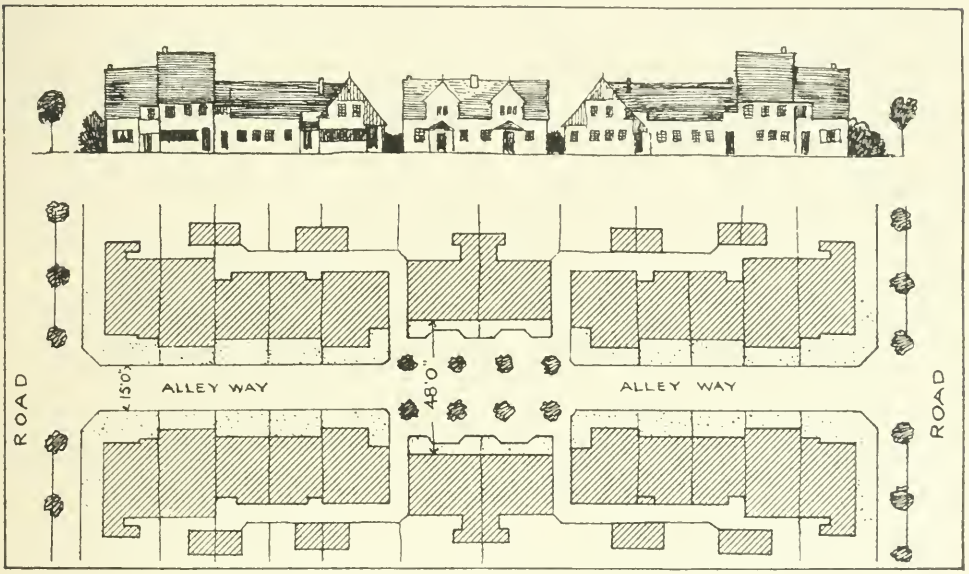


FIG. 61.—ENLARGED PLAN OF AN ALLEY-WAY

colouring of the paintwork. In a similar workmen's colony on the estate of Prince Pless, detached and semi-detached houses surround a circular playground overlooked by the windows of all the kitchens, as it is assumed that the mothers spend most of their time in this part of the house, and are thus enabled to keep supervision over their offspring.

In the plan of the Krupp industrial colony

"Margaretenhof" (Fig. 62), at Friedrich Alfred Hütte, all idea of regular arrangement of the streets has been studiously avoided. It will be seen that each house has its own small garden, in addition to which the

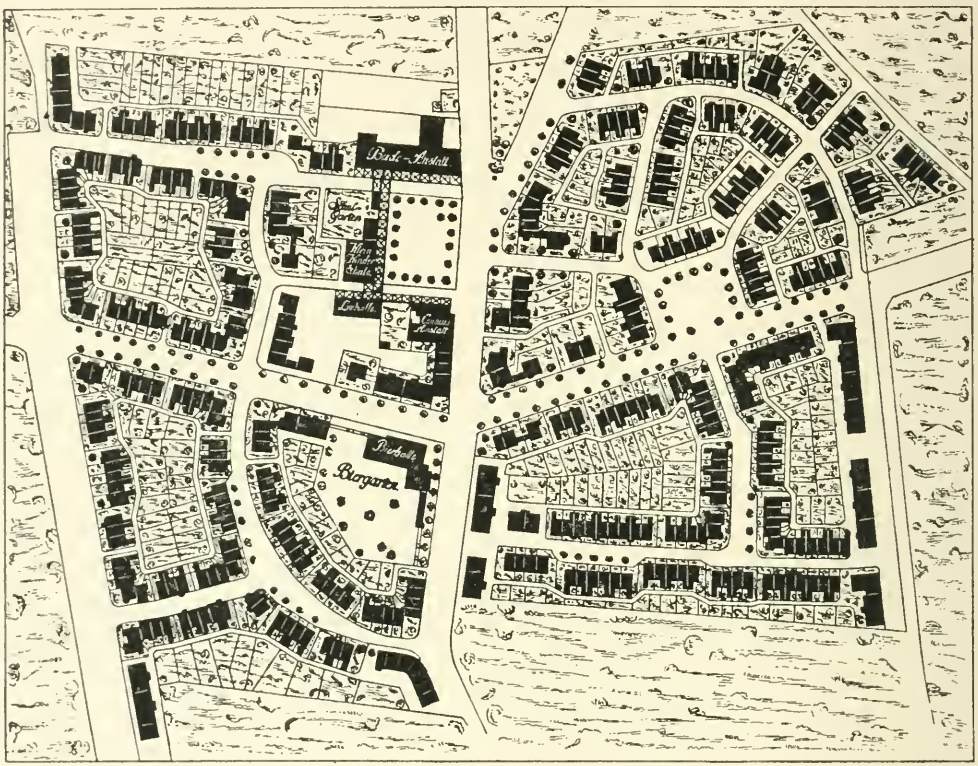


FIG. 62.—THE KRUPP INDUSTRIAL COLONY, MARGARETENHOF

central areas are divided into allotment gardens. The schools, public baths, general stores, and recreation room are all arranged round a central planted square. The colony comprises about 350 houses, exclusive of the quarters provided for single men.

The "Garden City" movement is already making

good progress in Germany. A German Garden City Association has been formed, and schemes are in course of development in the neighbourhood of Frankfort, Dresden, and other great cities.

France has so far not taken any legal measures to direct the growth of suburbs; and the improvement of French towns, for want of such laws, has been found to be so extremely costly that there is now a group of Members of Parliament who are bringing forward a Bill which will give similar powers of planning new additions to towns that Germany and other nations possess.

The suburban movement in Paris is unlike that of Berlin and more in accord with London. At the present time Paris is more densely populated than London, owing to the greater general height of buildings, but the flat system with no gardens appears to be losing favour, and in consequence the people are flocking to the suburbs, where the English villa style of life is becoming popular. The development has been late, for it is quite thirty years since the old fortifications sufficed to contain the city. On every line of railway leading to the capital a number of suburban stations have sprung up within the last few years, and for many miles outside the fortifications the country has been cut up into building plots. Owing to the splendid system of radiating thoroughfares the opportunities for successfully linking the suburbs to the city are much greater than in London.

About fifty years ago Vienna decided to move its

old ramparts and glacis and to construct the beautiful circular boulevard known as the Ring-strasse, which was subsequently embellished by a series of handsome public buildings. It was, as the name implies, a belt, and a large amount of the space given up was devoted to gardens. The result has been to provide a ring encircling the inner city, with magnificent streets 62 yards in breadth, having a total length of about two miles. By this and many other improvements evolved in the same scheme, Vienna has laid the foundation of a system of town planning on farsighted lines that will suffice for many generations to come and will easily allow of extension as necessity arises. At the present rate of increase it is estimated that the population of Vienna will have reached four millions by the year 1950, and that by then the greater part of the unoccupied land at present within the city boundary will have been built over. In order, then, to make ample provision for the future growth, and both to regulate the expansion of the suburbs and to preserve the charms of the landscape surroundings, a great effort has been made to acquire a broad belt of land known as the Wald und Wiesengurtel, at a cost of about fifty million kronen, which sum it is proposed to raise by means of a loan. Much of the land then acquired will be available for building purposes, and a splendid driving road will be provided through the entire belt, with superb panoramic views of the city and the Danube. This road will be joined to the city by a series of connecting thoroughfares. By this

farsighted policy Vienna will eventually become one huge garden city, within well defined boundaries and with ample means of communication between all parts of the suburbs and the Ring-strasse.

The first essential for the improvement of a city's

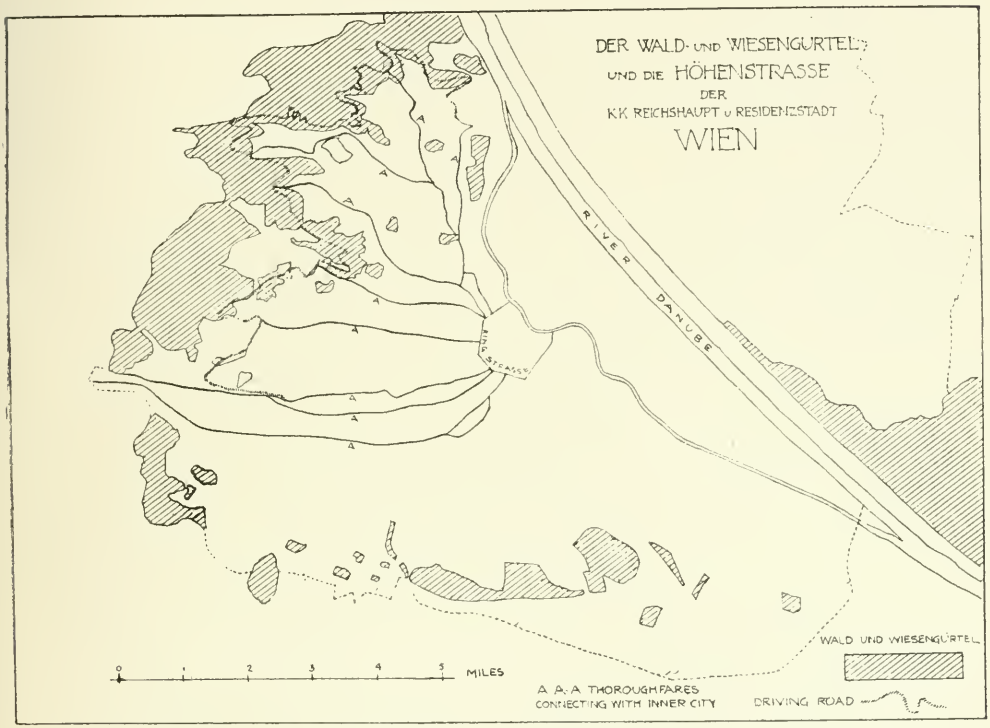


FIG. 63.—THE "WALD UND WIESENGURTEL," VIENNA, SHOWING THE THOROUGHFARES CONNECTING WITH THE HEART OF THE CITY

suburbs is the provision of adequate wide lines of thoroughfare to connect the centre with the open country, since the development of tramways and motor omnibuses is resulting in a continually increasing proportion of the population being brought to their daily work by these means, and of all the changes

that have taken place with regard to London traffic in recent years, none is more remarkable than the increased use of roads leading into the country.[1] The increase is almost entirely attributable to the growth of mechanical traffic, and is even more marked in vehicles used for commercial purposes than it is in motor cars of the ordinary type. Motor vans for the delivery of goods have come into general use and are now employed in considerable numbers by all classes of trade. Moreover, this form of traffic will undoubtedly increase as mechanical traction improves. For this reason, and also on account of suburban tramways, the main arteries of traffic within eight or ten miles of every great city must be in the future much wider and more numerous. On several occasions suggestions have been made for the construction of roads specially reserved for motor vehicles. There is much to be said in favour of such roads where it is only a question of linking up two towns, but any general system belongs too much to the future to be considered here.

When once the great trunk lines of road communication are practically settled, the authorities are in a better position to deal with each individual building estate or colony of houses. Here, instead of aiming at covering the whole suburban area with one vast expanse of houses, it would be much finer if an attempt were made as far as possible to define the area of the various small communities. The importance of this

[1] See Report of the London Traffic branch of the Board of Trade.

definition is one of the lessons that may be learnt from a study of many beautiful old towns, where the country often extends without a break to the walls. Compare this with the unkempt fringe of derelict houses and rubbish heaps that so frequently surround our modern towns! We cannot of course define the boundary by means of fortified walls, but we can do so by fine avenues, broken here and there by a belt of reserved meadow land.

In dealing with individual building estates, whether they be in the hands of a municipality or of a private individual, the guiding principles should be the same, and the first essential to obtaining a successful plan can only result from a close study of all the possibilities of the site. It is hardly possible to do this without preparing a contour plan, or better still a small scale model, the contour line representing every 5 feet variation in level. Such a plan will readily show the natural lines that the roads should follow, both for convenience of traffic and for an easy system of drainage. Next, it is advisable to locate as far as possible the various focal points of the plan, *e.g.*, the railway station, the point of junction with the main traffic artery leading to the city, and the business centres. The last will afford opportunities for the grouping of the church, municipal, and other public buildings, so that by the congregation of several important buildings some definite architectural centre may be produced to which the life of the suburb will naturally flow. An opportunity will often occur for

the judicious introduction of some formal gardening, and in the treatment of such a central place very much might be learned from a study of the market-places and picturesque village greens with which our country is so richly endowed. A survey should be made of all the trees upon the area, that these may be retained wherever possible. The cutting down of trees may of course be necessary in some cases where they stand in the way of necessary lines of roadway, but every effort should be made to preserve them, for anything that helps to relieve the newness of a building estate during the early years of its development should be eagerly welcomed. It is pitiable to see the way estates are so often entirely denuded of their trees in order to obtain line upon line of unbroken streets, when, often by simply setting back a few houses here or slightly altering the direction of a street there, they might so easily be preserved.

As to the direction of the roads, these may be either straight or curved—there are just as many situations where the one is required as the other; it is only essential that there be some definite reason for the adoption of either. It may be as an approach to a public building, a railway station or a church, or where a vista of some interesting object is obtainable, that a straight road is amply justified, but it should not be too long, and where it is planned for the purpose of traffic an occasional change of direction will add much to its interest. On the other hand, where the roadway ascends a hillside or follows a direction dictated

by some natural feature, such considerations will always suggest the curved line.

Instead of long lines of houses all exactly alike, very much may be done by gathering the houses into groups, each having some definite architectural form and arrangement, by setting some back a few feet from the roadway and others further forward, or by grouping them round a central green, which need

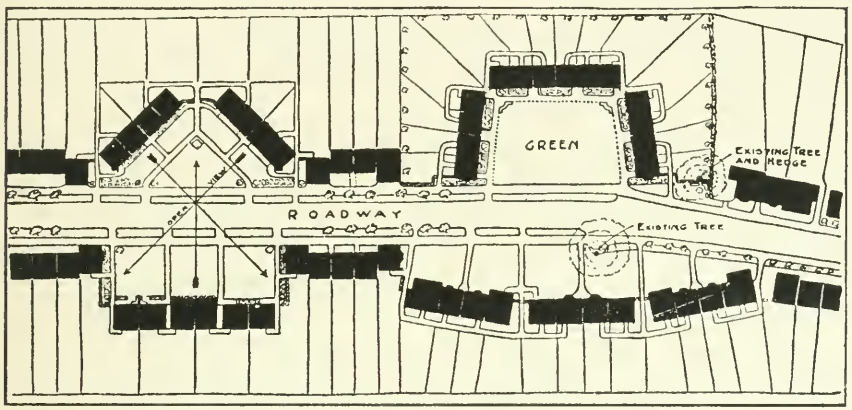


FIG. 64.—THE GROUPING OF HOUSES IN A SUBURBAN ROAD

not always be quite square, but, better still, triangular or irregular. By all these means a more picturesque and interesting appearance is given to the road. Such a system of grouping is particularly useful in the case of smaller houses, where the tendency to a monotonous elevation is greater. We illustrate in Figs. 64 and 65 good examples of such grouping designed by Mr. Raymond Unwin. In Fig. 64 is shown a triangular open space, the houses opposite being set back so that a view is obtained between them; existing trees are

carefully left, and the houses round the green are planned slightly out of square with the road. Fig. 65, which is a plan of the Bird's Hill Estate,

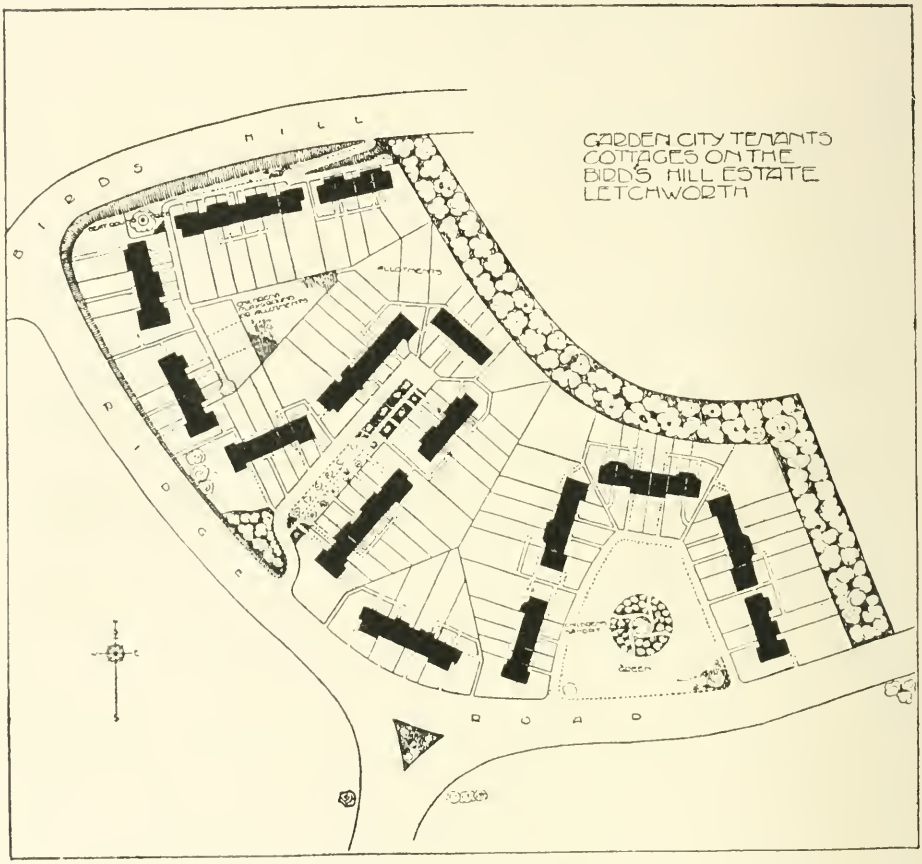


FIG. 65.—COTTAGE GROUPING ON THE BIRD'S HILL ESTATE, LETCHWORTH

Letchworth, is a clever example of the grouping of smaller cottages. In this case a children's sand-pit has been arranged in one of the greens, and in awkward parts of the site allotments and play-

grounds have been formed, wise provisions to endeavour to deter children from playing in the roads. Every opportunity of a distant view has been taken full advantage of. The treatment of the angle formed by the junction of two roads will often provide

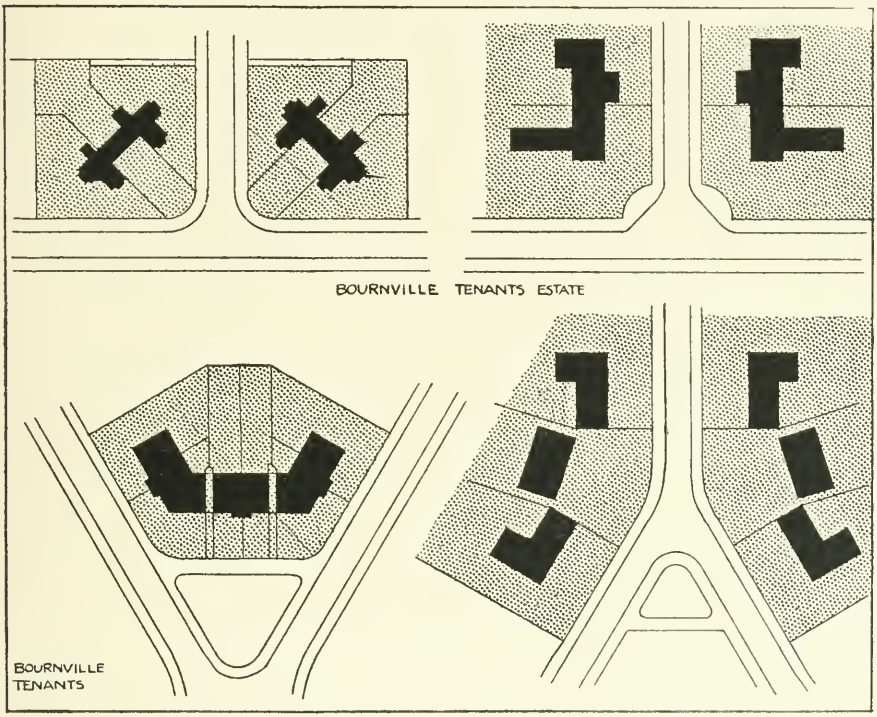


FIG. 66.—SUGGESTIONS FOR GROUPING CORNER BUILDINGS

occasion for a picturesque architectural grouping. We have shown several alternative ideas (Fig. 66) for the treatment of such an angle; in each case the buildings have been set back to allow vehicles turning the corner to have as wide a view as possible. This is a most important point; the mere splaying off of a

yard or two of building, that so often has to suffice, is altogether inadequate.

The making up of the roads, which in all estates is usually such an expensive matter, might be done in a far more economical way than at present. In poorer districts a very considerable economy might be exercised, and a far better result achieved, if instead of all the secondary roads being macadamised right across, as though they were highways, only a few yards of the centre part was macadamised and the verges on either side laid down in grass. If the children must play in the roads, and it is impossible to prevent them doing so, then grass must be better than mud. In these secondary roads the traffic is generally very small, and often in short roads, especially those abutting into highways at either end, the requirements of the case would be amply met if the merest track were laid down. The cost of occasionally cutting the grass would be considerably less than the sweeping of the road, and the playground afforded for the children would be a great boon.

One of the earliest experiments in suburban planning in England was successfully carried out in 1881 by a private syndicate at Bedford Park, near London, where a picturesque little colony of middle-class houses was established from the designs of prominent architects, mainly under the direction of Mr. Norman Shaw, R.A. Before the estate was laid out the site consisted only of low-lying fields and waste land, having an area of rather more than 100

acres. The main roads diverge upon a point near the railway station, and the church and parsonage, a general store for the sale of every class of goods, a club and an inn are grouped in close proximity. Every old tree upon the estate was carefully preserved, roads being diverted and houses set back in order to avoid their removal. The houses are everywhere cleverly grouped, with here and there a short terrace, and the architecture is all of the character of seventeenth-century English domestic work. The plots are about 75 feet deep and have 50 feet frontage for a pair of houses, and the houses are set back 15 or 20 feet from the roads, which are all lined with trees.

The town planning movement in England practically began with the foundation of Port Sunlight, near Birkenhead, some twenty years ago.[1] This was followed by Bournville and similar towns. In 1900 the Garden City Association was started for the purpose of testing the practicability of suggestions put forward by Mr. Ebenezer Howard, the author of "Garden Cities of To-morrow." So convinced were the members of the Association that there were great possibilities in the idea, that in 1902 the Garden City Pioneer Company was formed. In 1903 the Company known as the "First Garden City, Limited," was founded, with a capital of £300,000, the dividend on the shares being limited to a cumulative dividend of 5 per cent., all further profits to be devoted

[1] Port Sunlight was, of course, not the first workmen's colony to be laid out in England.

to the benefit of the town and its inhabitants. As a result of this co-operation the town of Letchworth was begun, and has since continued to develop in a highly satisfactory way, and the "Garden City" movement shows every prospect of extending throughout the country. A consideration of the economic side of the movement hardly comes within the scope of the present work, and, moreover, a very extensive literature has already appeared on the subject.

At Letchworth the First Garden City Company has taken a tract of agricultural land with only 400 inhabitants and created a town to contain eventually a population of 32,000. The area of the town, including roads and open spaces, amounts to about 1,300 acres, and round this is an agricultural belt of about 2,500 acres. All the essentials of the town, from the factory sites to the cottages and villas, have been planned from the beginning, and are being carried out according to that plan, with only such slight variations as may prove necessary from time to time. The project is still in its initial stages, but it has already proved the great advantages which result to all classes by working on a deliberate plan. Ample garden space is allowed to every class of house; spaces for parks and recreation grounds have been reserved. Sites for public buildings, such as schools and churches, have been reserved in neighbourhoods that are certain to require them. The factories have been placed in such a position that they have direct communication with the railway and are not mixed up with the residential part

FIG. 67. PLAN OF THE GARDEN CITY AT LETCHWORTH

of the town; while round all this a belt of open land has been reserved, so that the inhabitants will always be within reach of the real country.

At the outset of the scheme the main lines of sewers were laid down, and to a large extent guided the planning of the town; a complete plan of development was then drawn up, so that the town should grow along harmoniously defined lines, with all its different parts co-related and unified. The growth was to be as natural and unforced as that of any ordinary town, but it was to be previously planned and organised. The very crux of the proposal put forward by Ebenezer Howard was that absolute control of the land on which the new town was to be built must be first obtained, so as to administer it in the interests of the whole community. To that end the number of even the smallest houses allowed to be built at Letchworth is twelve to the acre. Overcrowding, slums, and insanitation are, therefore, practically impossible. Well wooded parks, breezy commons, and abundant open spaces ensure that the residents are not stinted in the supply of fresh air and sunlight. Nearly two-thirds of the land is to be permanently left as an agricultural belt around the estate, on which small holdings, farms, &c., will arise. A large part of the estate is planned for factories and workshops, all easily accessible from the railway, to which many of the plots are tangentially arranged to allow a separate line to be run into each plot. The builders' yards are arranged all together in one block; the artisan population is placed on the

north, and at such a distance from the place of their employment as to be convenient. The more expensive sites are on the south and south-west. It is not intended that the garden city shall ever grow to a town of a greater size than will accommodate 35,000 people, and before this stage is reached development will stop, as far as the city is concerned.

Port Sunlight, the English centre of the immense soap industry of Messrs. Lever Brothers, was founded by Mr. W. H. Lever about the year 1887 as a result of a careful study of existing social conditions. "The intention," says Mr. Lever, "was to build works and village. The area covered by works and village now amounts to about 230 acres, of which 140 are devoted to the village. From the picturesque point of view the site had little to commend it, consisting of flat lands and several ravines, up which, to a greater or less extent, the tide used to flow. These were partly filled up and levelled to raise them above high-water mark, and the land thus reclaimed was used as parks and recreation grounds, so treated that it forms quite the feature of the village. The roads have been so planned that, whilst making direct and shortest ways to important points, such as the railway station, the ferry, the tramway terminus, and to the office and works, they shall still form, wherever possible, curves and sweeps following the lines of the ravines. Another object aimed at in the laying out of the village has been that none of the houses should have their backs to the railway line. It is remarkable how little this is

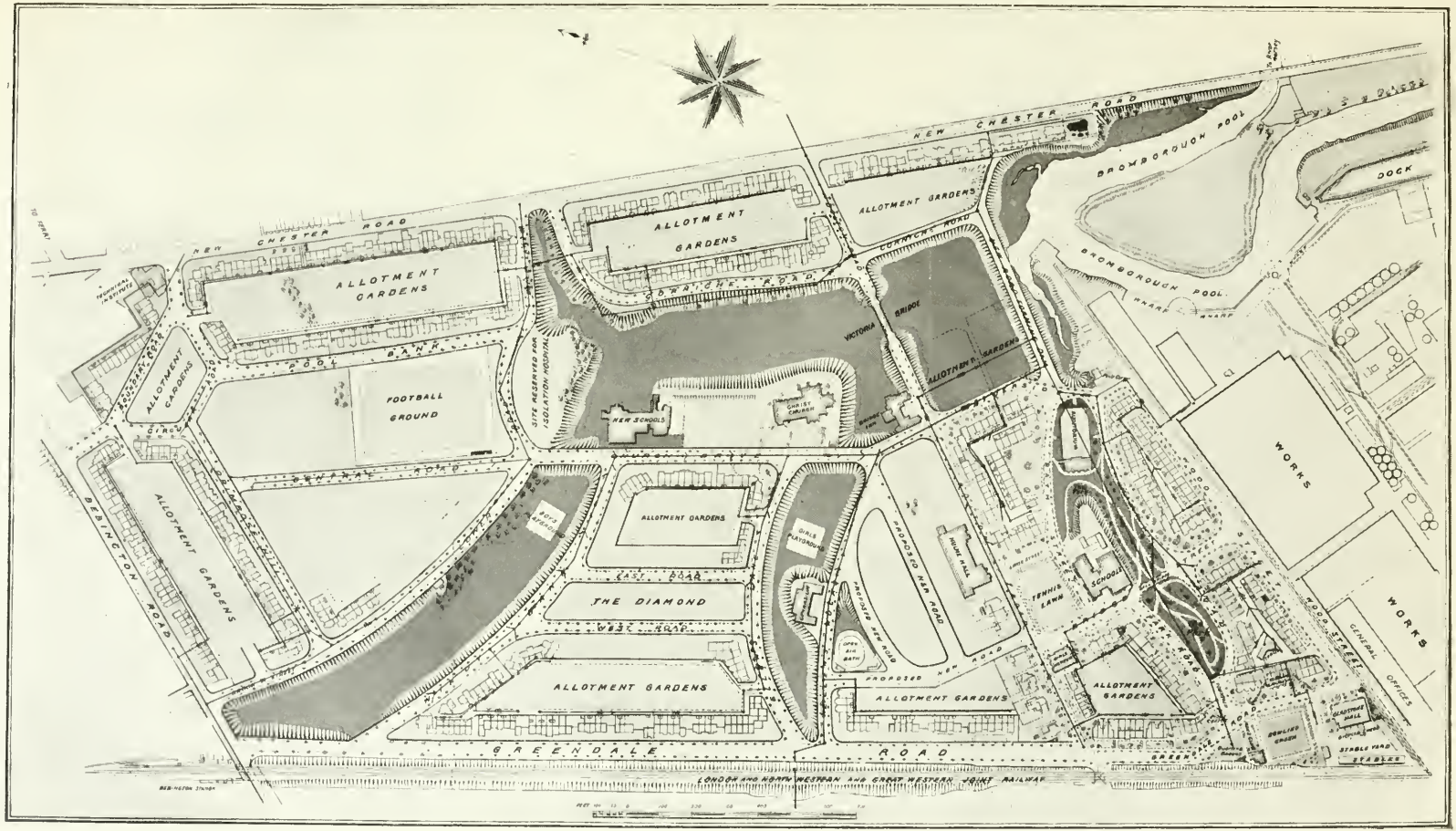


FIG. 68. PLAN OF PORT SUNLIGHT

thought of in laying out building land adjoining railways, and yet it is a very important feature, governing the financial success of an estate, as houses backing on to a line must be of less value.

"The general width of the roads has been fixed at 40 feet—8 yards roadway and 8 feet each for footpaths. The widest road is 12 yards for roadway and 12 feet for footpaths. In order to realise the intention of leaving the ravines as parks and recreation grounds, and at the same time not diverge from the directness of the roads to adjacent local centres, the ravines had to be spanned at several points by means of banks of earth, with two exceptions, where bridges have been built."

"The financial aspect of the village of Port Sunlight is soon told. The capital it has taken to buy the 140 acres of land, build the cottages, houses, schools, shops, institutions, clubs, &c., and including making the roads, laying out the parks, &c., has been over £350,000, upon which Messrs. Lever Bros. receive no interest or return whatever, the rents being fixed at such an amount as only to pay for rates, taxes, repairs, and maintenance."

Another important, and in some ways more interesting scheme, is the village of Bournville, near Birmingham, the home of the great cocoa works of Messrs. Cadbury Brothers. The present village was founded by Mr. George Cadbury as a result of years of practical experience and careful study of the housing of the working classes, and in order to make a practical

experiment to relieve the terrible overcrowding existing not only in great cities but often in the smallest country villages. At the present time nearly 1,000 houses have been built (the total population of the village being about 4,000), and the founder has secured the perpetuation of the scheme by making over the land, consisting of about 400 acres, with the houses already erected, to a board of trustees. These trustees receive the whole of the revenues of the estate, which are to be applied to maintaining it, or building new houses, acquiring fresh land and generally extending the scheme. The total value of the property thus handed over to the trustees was estimated at about £180,000. It will be seen that the scheme is capable of almost endless development. The capitalist landlord is eliminated, and as no personal gain accrues to anyone, all the profits are at the disposal of the trust.

The scheme is not intended to benefit only the workpeople of Messrs. Cadbury, but is open as far as possible to all who wish to share in its advantages. The average garden space allowed to each house is about 600 square yards, and as far as possible no dwelling will occupy more than one quarter of the site on which it is erected: each garden is planted with fruit trees, and the tenants are induced to grow their own vegetables and fruit as a set off against the rent, and at the same time to afford a means of recreation, which in a town would be sought for in more expensive and less healthful ways.

The factories being surrounded by higher ground,

the beauty of the village does not suffer in the least from their proximity; indeed, it is hard for the visitor to realise that they are so near. Bournville in this respect is an object-lesson, and shows that the presence of a manufactory need not necessarily mean the deterioration of its surroundings. The roads are wide and

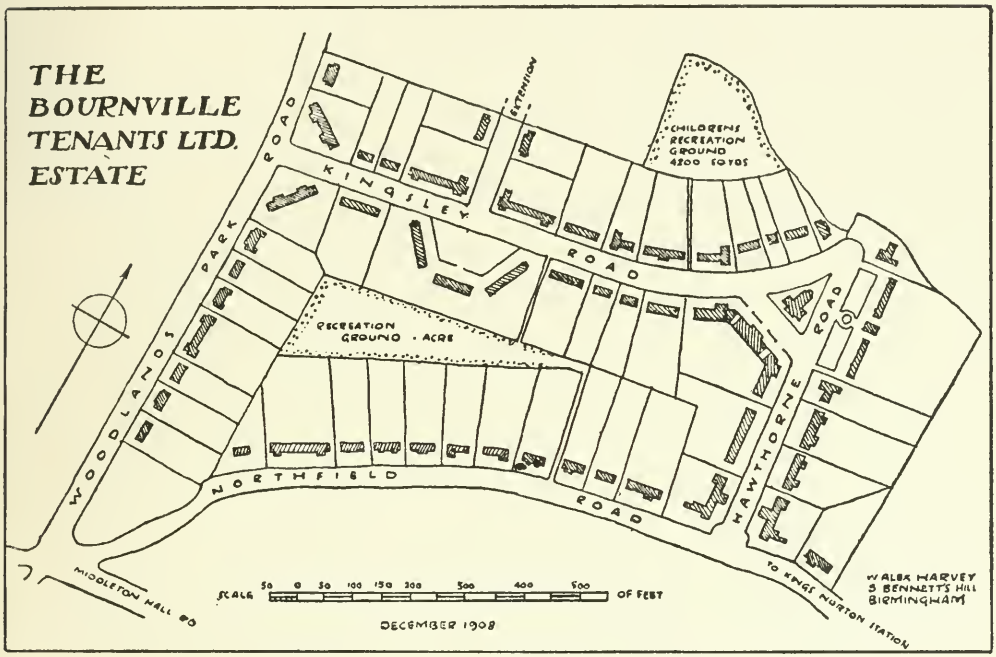


FIG. 69.—THE BOURNVILLE TENANTS' ESTATE

in every case planted with trees, and as the country is of an undulating character, many opportunities have been afforded to give a charm and diversity to the village.

Another interesting housing plan upon a much smaller scale has been recently inaugurated near Bournville. A company has been formed to build, own,

and manage houses on the copartnership principle. The society known as the Bournville Tenants, Limited, has leased about twenty acres of land for a term of 99 years (renewable at the option of the society); eighteen acres are leased for building purposes and two acres are granted by the landlord rent-free for the purpose of permanent open spaces and recreation ground. The position of the estate is in every way desirable. It stands high, commanding extensive views over the beautiful country which surrounds it, and has been laid out in such a way as to give the occupants of each house a share in the distant views. The plan (Fig. 69), by Mr. W. Alex Harvey, combines the advantages of picturesque grouping of the cottages with economy in road-making. To working men with only a moderate weekly wage who find it almost impossible to acquire a house of their own by other means, this plan of acquiring and owning house property has considerable advantages.

Port Sunlight and Bournville are recognised as the pioneers of town planning, but these two communities, excellent as they are and widespread as has been their splendid influence, fail in some points to come up to the standard that has since been attained. Both places have been hampered by the inelastic bye-laws of local authorities, and in consequence much money has been wasted on completely macadamised roads, when all the requirements might just as well have been met by a narrower central roadspace with grass verges on either side.

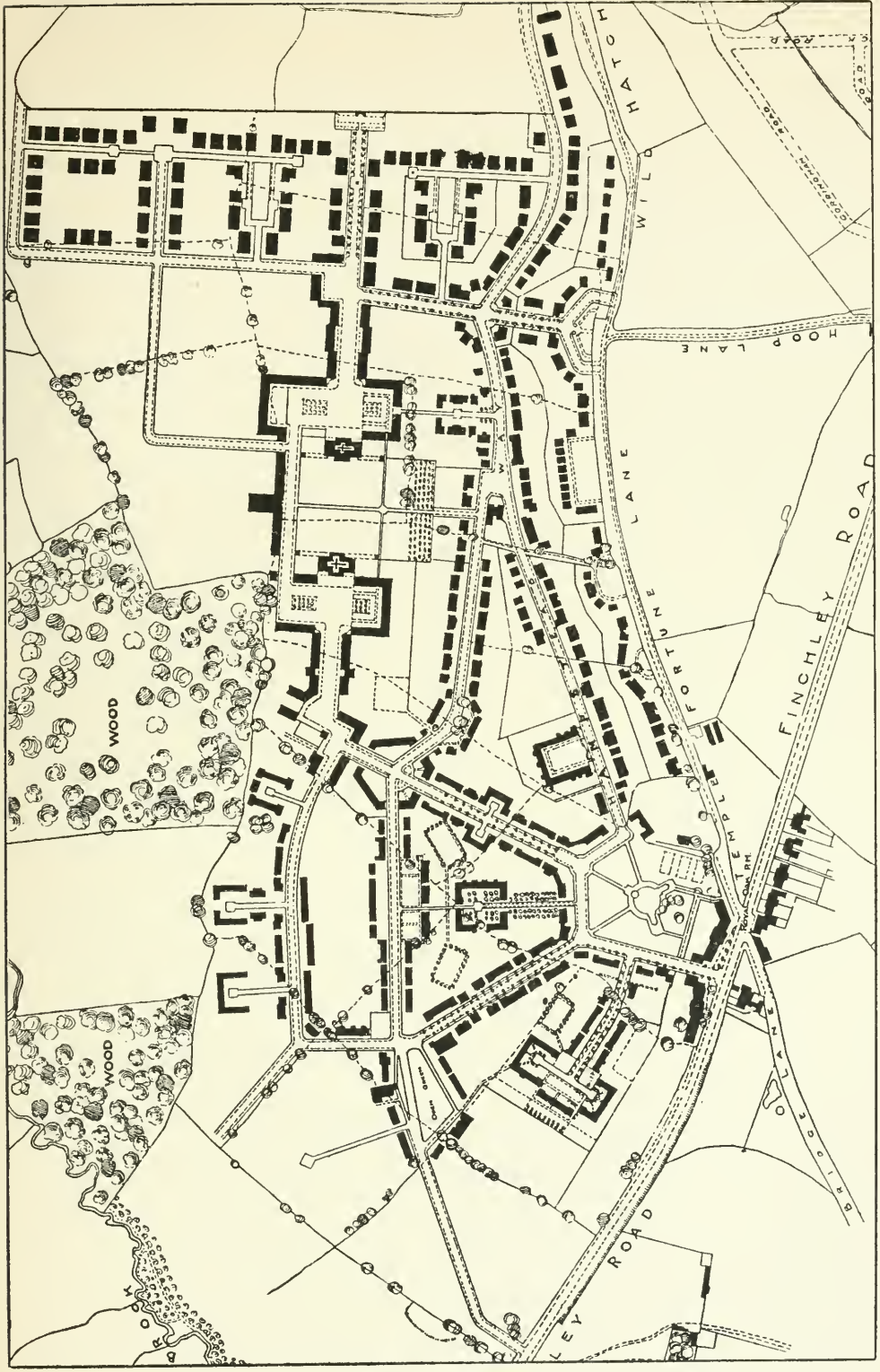


FIG. 70.—HAMPSTEAD GARDEN SUBURB

Another very interesting experiment is now being planned at Hampstead, where a model suburb is in course of construction. The land on which the new suburb has been created is immediately to the north of Hampstead Heath, on the borders of the County of London, and comprises about 320 acres. This land was not built upon, because until recently there was no demand for building land in that position, the estate being severed from London by the high and steep hill of Hampstead; moreover, there was no direct communication with London until a tube railway was recently constructed. The property then, of course, increased in value, and, like other similar estates all round London, was soon destined to become covered with small houses; but by philanthropic intervention the owners were induced to give two options: an option on 80 acres for a space to be preserved as an open space and added to Hampstead Heath, and an option of purchasing the remaining 240 acres to be laid out as a garden suburb. Both those options were exercised. The 80 acres were vested in the London County Council, and the 240 acres belong to the Hampstead Garden Suburb Trust, Limited. In laying out the estate the directors of the Company decided that not more than eight houses should be built to the acre, on the average, throughout the whole area, and also that the houses should be of all sizes. The suburb is not intended to be occupied solely by rich people or solely by the artisan class, but while a considerable area should be devoted to artisan dwellings, a part of the estate should be occupied by

houses of from £30 to £50 a year, and in addition to those there will be some quite large houses. The roads are architecturally laid out, being planned with due regard to the contours, and with a view to obtaining striking vistas, as well as good access between all parts of the estate, and easy gradients. An effort has also been made so to arrange the houses that each one shall have something pleasant to look at, and in several parts of the estate agreeable effects of colour have been produced by the combination of houses of different materials. It is also intended to arrange for a central place, round which the more important public buildings will be grouped.

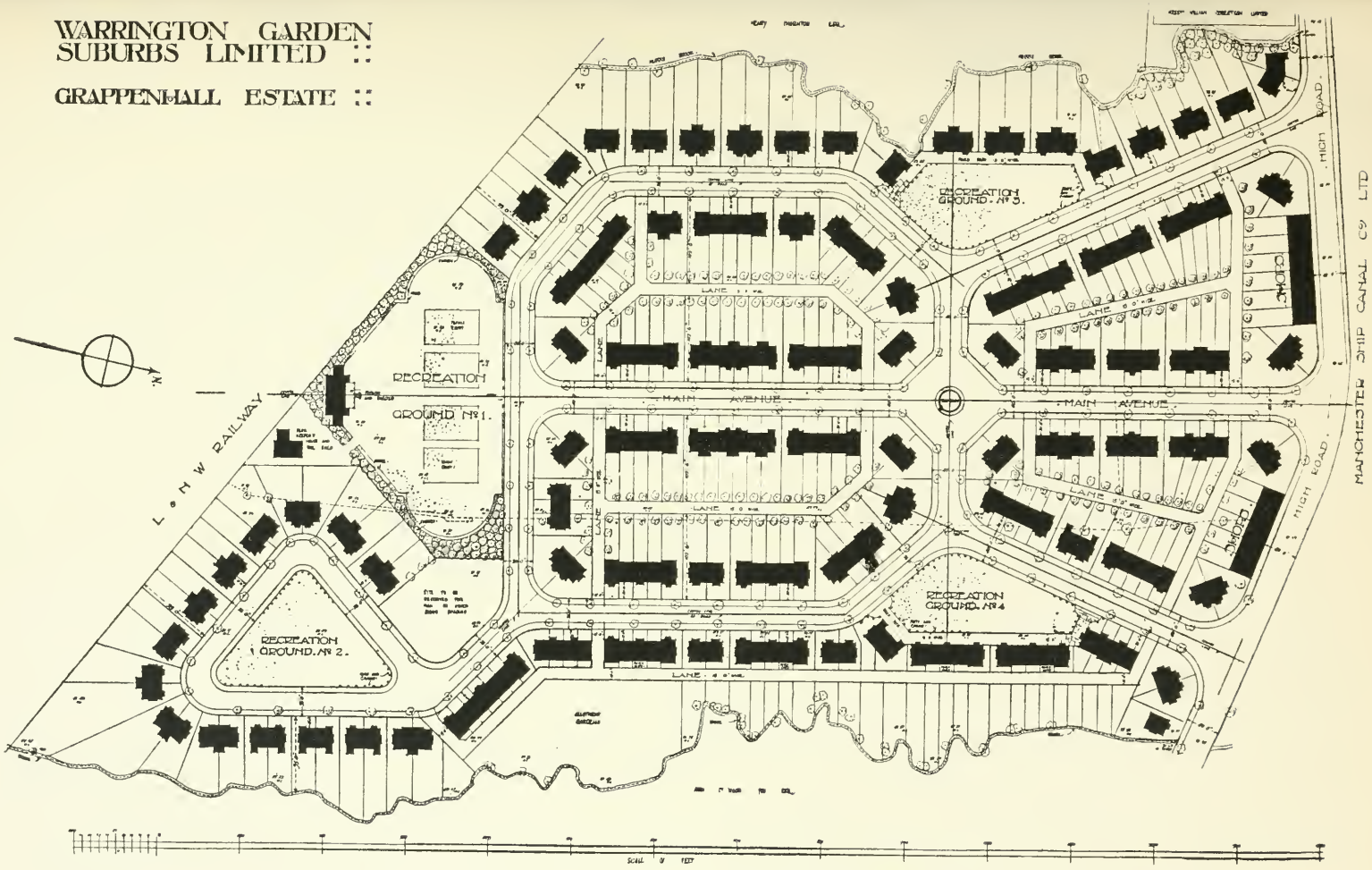


FIG. 71.—WARRINGTON GARDEN SUBURBS, PLAN OF THE GRAPPENHALL ESTATE, MESSRS. A. AND J. SOUTAR, ARCHITECTS

CHAPTER V

THE PLANNING OF STREETS

THE first idea that probably occurs to anybody who is engaged in laying out streets is the desirability to get from one point to another as rapidly as possible, and to do this by making the direction of the street as near as possible a "bee-line." The idea of planning streets in straight lines is of the greatest antiquity, and we find the very earliest city plans of Egypt invariably following the rectangular system, as far as the main lines of traffic are concerned; Greek and Roman cities also favoured the system, but during the Middle Ages, with certain exception already noticed, there appears to have been a deliberate attempt to avoid a straight line. With the Renaissance of the fifteenth century the idea of regular streets was again revived, and we find that in those few examples of cities which were planned as an entire scheme the streets were invariably kept in as straight lines as possible.

Much may be said both for and against planning straight streets and uniform buildings. Let us first

consider some of their merits. A fine straight road is certainly advisable whenever stately and official requirements demand a dignified approach, as, for example to a palace, a great public building, or to a railway station; but the street must not be too long, and where a uniform treatment of the architecture is adopted, every effort must be made to keep the treatment well within bounds. The long, straight, interminable approaches that the city planners of the eighteenth century so dearly loved to lay out should hardly be perpetuated in this age. Where the focal point is elevated and the slope leading up to it of sufficiently easy gradient, as at the Arc de Triomphe in Paris or the Capitol at Washington, a straight approach is eminently suitable, but generally speaking, a street whose direction does not change for mile after mile cannot but be fatiguing, even though the country traversed be of the greatest interest and beauty. By its unalterable straightness it contrasts with nature, and does not take note of the irregularities of the land; it is so uniform that we have only one desire—to reach its extremity. Where a straight street has to pursue its course for a considerable distance it is often advisable to make a break in the line of axis (see Fig. 72), either by means of a square or open space, or even by the planting of groups of trees, which afford welcome relief and may be introduced with admirable effect without sufficiently breaking the line of route to interfere seriously with traffic: the curves should be made easy and any sharp change of direction strictly avoided. It is, how-

ever, by no means easy to impress this idea upon the authorities, to whom the absolutely straight line often seems to be the only solution in the formation of new streets.

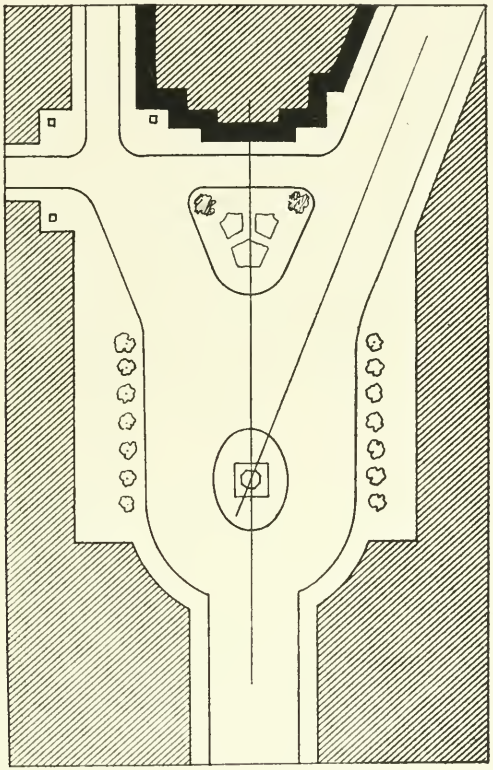
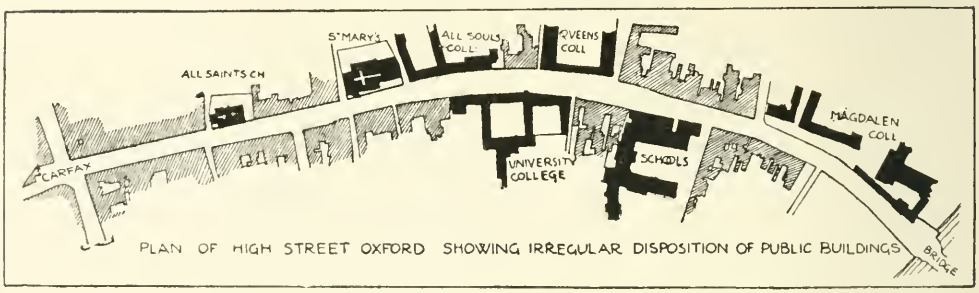


FIG. 72.—SUGGESTION FOR DISGUISING CHANGE OF DIRECTION IN A LONG STREET

A point that is sometimes urged in favour of straight streets is that a more workable site is thus obtained, and on this account landowners are often afraid to create an irregular site, but this view will certainly not be held by the majority of architects, who, on the contrary, will

rather welcome the opportunity of showing their talent, for such sites offer most interesting problems, and he would be a poor architect indeed who did not take keen interest in endeavouring to solve them.

How often we see much money wasted in buying some expensive piece of property to straighten a street, when the effect would perhaps have been improved had a cheaper piece of land on the opposite side been acquired! It is in the decision of this kind of point that



PLAN OF HIGH STREET OXFORD SHOWING IRREGULAR DISPOSITION OF PUBLIC BUILDINGS

FIG. 73

expert advice might so frequently be called in with great advantage to a city both from the financial and the artistic point of view.

There is no doubt that the curved or winding street has a more picturesque effect than one that is straight. The Grand Canal at Venice is a good instance of the beauty of a winding highway, and although so many of the buildings upon either bank are classic and formal, they do not seem to lose anything from the winding nature of the canal. Indeed, classic architecture is often improved by being set upon a curve; witness, for

FIG. 74. HIGH STREET, OXFORD

FIG. 75. RUE DE RIVOLI, PARIS

example, the new buildings in Regent Street and the fine classic blocks of Whitehall.

A comparison of a straight street with regular uniform buildings and a curved one may be made by seeing side by side the High Street at Oxford and the Rue de Rivoli at Paris. In the former, the vista constantly varies as we walk down the street—tower and spire and other features of beauty come into view one after another and form picturesque groups that have a beauty and charm which it does not need an artist to appreciate. In the Rue de Rivoli we can hardly fail to soon tire of the monotony of hundreds of arches all exactly alike in their detail, and more value would have been given to the architectual effect if the long line had been occasionally broken up by recessed blocks of buildings or groups of trees.

Curved streets separate themselves into two classes. Firstly, the monumental or conscious and deliberate effort, designed either on account of the exigencies of the situation, as in the case of Regent Street, or as a means of giving enhanced effect to some important feature in the city plan; and secondly, the accidental or picturesque curve arising from the juxtaposition of irregular sites, and which it is so often the misplaced endeavour of municipalities to correct.

The curve in street planning is not to be avoided, but rather gladly accepted, when the conditions of the site suggest it, as, for example, upon sloping land, or when by adopting a curved line expense may be saved in the cost of levelling. The gentle curvature in the

lines of old streets, offering fresh pictures to the eye at every step, is often that which gives them considerable charm, and if any alteration has to be made it is by no means advisable that all windings should be destroyed. In new streets, a slight curvation of the axis line will produce the happiest effects, and where this is done the concave line of frontage is most valuable in improving the appearance of the street, and should be broken as little as possible. The convex side is less disturbed by openings into it than the concave, but at the same time it is not so well adapted for important façades, as the field of vision is very limited in that direction.

When a river winding through a town is enclosed on either side by embankments, the sweep of masonry lining the banks may be a very fine architectural feature, as most of those will agree who have seen the Thames Embankment from Westminster Bridge or admired the Arno at Pisa or the Tiber at Rome. Compare the fine sweep of the Arno Embankment at Pisa with the ugly angles on Franz Josef's Quai at Vienna. How much more restful to the eye is the former graceful curve than the latter series of straight lines so nearly forming a segment!

Architects of all ages have in some way or another felt the value of curved lines in their buildings, and have generally hailed with pleasure any opportunity afforded them of bringing them into their designs. The Coliseum, the apse of a Gothic cathedral, Bernini's Colonnade at St. Peter's, the Albert Hall, or the Place

FIG. 76. THE RINGSTRASSE, VIENNA, SHOWING THE EFFECT OF CHANGING THE DIRECTION OF A STREET

FIG. 77. THE THAMES EMBANKMENT

FIG. 78. THE ARNO EMBANKMENT, PISA

FIG. 79. FRANZ JOSEF QUAI, VIENNA

de l'Étoile in Paris—all these are examples of the individuality and distinction which the curved line gives.

The character of a curved street is entirely different from that of a straight one: the sides disappearing from view round a corner provoke a sense of mystery and curiosity to discover what is beyond. Look at the view of the Strada dell' Abbondanza at Pompeii and note how the lines of curb disappear in a graceful bend. In England the value of curved lines has been more generally appreciated than on the Continent or in America, and we find the principal streets of English towns much more often following curved than straight lines. In the West End of London are many streets which, although composed of houses of similar and commonplace design, receive added dignity from their unbroken curved lines of cornice. There is the well-known example of Regent Street and the more recently constructed approach to Kingsway, where the effect is very striking. Fine examples of curved streets may be seen in the Piazza Castello surrounding the castle at Milan, the Ring-strasse in Nüremberg, the Place Meir in Antwerp, the Hansaring in Cologne, and the Maximilian-strasse in Augsburg.

Sometimes streets have been planned in the form of a double curve, and although such a form should only be used where necessitated by the nature of the locality, it has the advantage of considerably minimising the general defect of curved streets, viz., the decrease of architectural effect on the convex side.

The grading of a street, or the rise and fall in its

levels, must be considered from two distinct points of view—one, the practical point of view, taking into consideration questions of gradient for drainage, traffic, and the varying levels of the buildings on either side, the other the æsthetic point of view.

Traffic requirements naturally demand that all streets should be as flat as possible; according to Stübben, the law in Germany limits the gradient of public streets to 1 in 50, and wherever practicable it is suggested that in secondary streets of considerable length a grade of 1 in 40 should be aimed at. Where the land is level, such gradients should only be applied under very exceptional circumstances. The French Administration des Ponts et Chaussées admits the limit of 1 in 33 for the inclination of a *route royale* and 1 in 20 for a *chemin vicinal de grande communication*.[1] It is inadvisable to lay asphalt on a greater ascent than 1 in 70. In hilly towns gradients of 1 in 25 or 1 in 20 sometimes cannot be avoided even in main streets, whilst in side streets gradients as steep as 1 in 10 have sometimes to be tolerated. When steeper inclines have to be dealt with, stairs or footways should be provided. For drainage purposes a fall of 1 in 200 or 1 in 400, according to the nature of the road surface, must be considered as the least admissible for the street gutters.

[1] As a comparison it will be interesting to note the following examples of streets in London, taken from the Dictionary of the Architectural Publication Society: St. James Street, 1 in 27; Haymarket 1 in 22; Ludgate Hill, 1 in 25; approach to Waterloo Bridge, 1 in 31. Telford estimated the limit of a hill for a stage coach at 1 in 32.

The best form of street levelling is the concave, or that which passes from the horizontal to a greater rise; when the "head" of the street rises it imparts a more stately appearance, and the perspective effect is finer. Magnificent examples of such streets are to be seen in the Avenue des Champs Elysées, Paris, or the Via Nazionale in Rome. The former is a striking example of masterly town planning. The summit of the Champs Elysées is crowned by the Arc de Triomphe, which forms the focal point of a splendid

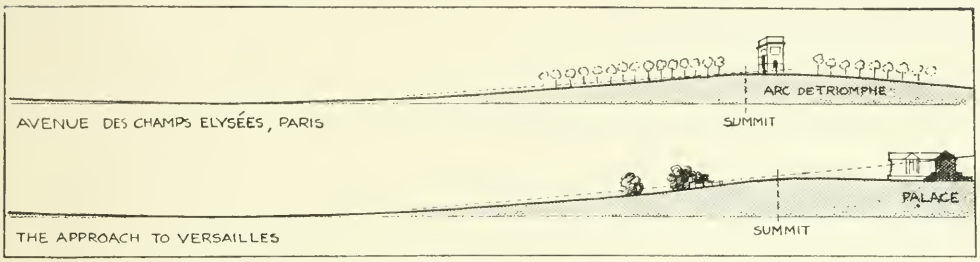


FIG. 82.—STREET LEVELLING, SHOWING THE EFFECT OF PLACING A MONUMENTAL BUILDING ON, AND OFF, THE CROWN OF A RISE

system of radiating avenues; the vista from the Place de la Concorde, when lit up by hundreds of lamps in the evening, is unrivalled by any roadway in Europe (see Fig. 1). Concave levelling may also be very successfully applied to open spaces whenever they lead up to some important feature, as in the case of St. Peter's, Rome. A fine opportunity for a similar treatment was lost at Versailles owing to the façade of the Palace being placed too far from the crest of the rising ground. Compared with the concave form, the uniform ascent of a road in a straight line is dull and uninteresting.

When the levelling of a street is convex—that is to say, when the eye can only follow the surface of the street as far as the crest of the rise—the effect is most unpleasant. In several American cities this is to be seen where street after street in towns planned on the chessboard system terminates abruptly on the skyline and descends beyond, so that the houses beyond the summit appear to be sinking into the earth, and only the upper parts of figures and vehicles are visible, just as at sea the masts of a ship become visible before the hull. Such streets, then, should be avoided where a monumental effect is desired, or if they cannot be avoided, an improvement may be made either by turning the direction of the street or dividing it in two at the summit of the rising ground.

The width of streets must depend first of all on the claims of the traffic to be accommodated, and until the amount of this traffic is known, and allowance made for the probable future increase, it is useless for authorities to lay down hard and fast rules to apply to all new streets. In the case of a gradient, for example, where all horse-drawn traffic will proceed at walking pace, whilst mechanical traffic will go much faster, it would not be right to apply the same rules as in the case of a road on the level. In main thoroughfares the width desirable may be 150 feet or more, whilst in by streets the width may sometimes be reduced to 25 feet. All intermediate widths depend on the circumstances of each case. One of the worst features of English cities is the miserable narrowness of the majority

of the streets, and as traffic increases it becomes more and more apparent that the minimum width hitherto considered sufficient by the authorities will have to be enormously increased. The provisions as to the width of streets made by the London Building Act are already inadequate for present requirements. Shaftesbury Avenue and other important London streets laid out within the last few years have proved too narrow for the traffic, and the footways are so narrow that the trees planted there will never have sufficient room to grow. The inadequate width of main arterial streets means a considerable annual loss to the community, and it has been proved more than once that the prosperity of a city depends enormously on the facilities afforded for the free circulation of traffic. Napoleon foresaw this when in 1807 he passed the "Loi d'Alignement," the action of which has been of so great a benefit to Paris.

Realising the inadequacy of width of the London streets, the Traffic Commission in their report advise that new or widened streets should be laid out according to the following standard of width from house to house, and that they should be divided into five classes.

	Feet.
Main avenues	140
First-class arterial streets ...	100
Second-class streets	80
Third-class streets	60
Fourth-class streets ...	40 or 50

The width in each case includes footways on either side, and no street should be less than 40 feet wide. This standard of width is intended to be applied within London, and also in the suburbs.[1]

Such provision for traffic is a great advance on the requirements of the London Building Act of 1894, which put the average width for a carriage way "in the public interest" at 40 feet clear or 20 feet from the centre of the roadway to the nearest external wall, and further laid down that nothing could authorise the Council to require a greater width than 60 feet. Such inadequate provision and want of foresight have resulted in large areas with mean roadways being laid out in

[1] The following table is a comparison of the widths of important streets in Europe with those of London :—

	Feet.
Avenue des Champs Elysées, Paris	230
Reeperbahn, Hamburg	210
Unter den Linden, Berlin	190
Ring-strasse, Vienna	185
Belle Alliance Strasse, Berlin	160
Andrassy Strasse, Buda Pesth	145
Avenue Henri Martin, Paris	130
Potsdamer Strasse and Friedrich Wilhelm Strasse, Berlin	110
Avenue de l'Opéra and Parisian Boulevards ...	98
Whitehall	120–145
Victoria Embankment	120
Holborn Viaduct	90
Regent Street Quadrant	85
Piccadilly	75
Queen Victoria Street	70
Oxford Street	64
Cheapside	60
Princes Street and George Street, Edinburgh ...	100

the suburbs, many of which are destined to become important arterial thoroughfares and in consequence will eventually have to be widened at considerable outlay.

In a business thoroughfare each pavement should be wide enough to take three streams of traffic and the road wide enough to take four, which would give a total width from building to building of at least 55 feet.[1] This would allow of the traffic being divided into fast and slow, the middle of the road being devoted to two streams of quick traffic, going opposite ways, and on each side one stream of slow-moving traffic. Similarly, with the foot traffic, the slow should be nearer the shop windows, the rapid nearer the roadway.

In the code of model bye-laws issued by the Local Government Board, the minimum width being fixed at 36 feet has produced miles of streets throughout England insufficient for modern traffic, especially where such streets happen to act as main arteries connecting adjoining districts. Many of our provincial towns have wisely decided to increase these widths, but the whole question is one on which new legislation is badly wanted. Streets once formed are permanent, and future widening operations can only be carried out at considerable expense, and the provision of adequately wide streets for future generations is of infinitely more

[1] The normal width of a wagon loaded is 7 feet 6 inches, or with a safety margin say 8 feet; thus a double carriage way cannot be less than 16 feet and the four carriage roadway 32 feet.

importance than the immediate convenience of building owners. An objection frequently raised by authorities to the provision of an increased width of roadway to meet the probable future traffic requirements is the extra expense entailed for construction and upkeep. But this objection may be met either by providing broad grass verges on one or both sides of the road, or, where the increased width is unlikely to be required for a number of years, by widening the footways, and only paving say one-third, the rest remaining grass or gravel. This

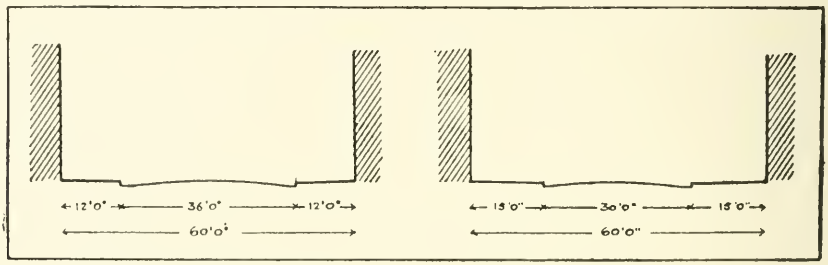


FIG. 83.—STREET PROPORTION OF 1 : 3 : 1

FIG. 84.—STREET PROPORTION OF 1 : 2 : 1

has been done in several important boulevards of Paris. Either of these expedients is much cheaper than purchasing property for street widening.

We have not hitherto devoted much attention in England to the consideration of what might be called the cross-section of streets, of the proportion to be borne between the roadway and footpath, and also of the best and most effective positions for the planting of trees. Much of the beauty of the larger thoroughfares on the Continent, which are thoroughfares in every sense of the word, is due to the amount of care

that has been taken in proportioning and dividing up the various classes of traffic. In Germany especially this has been the case, and Herr Stübben gives the following as being the proportions usually adopted. For the smaller ordinary streets with heavy traffic the proportion is 1 : 3 : 1 ; with a lighter carriage traffic it is considered preferable to restrict the carriage way to one-half of the street width, making the proportion 1 : 2 : 1, an arrangement which reduces the cost of

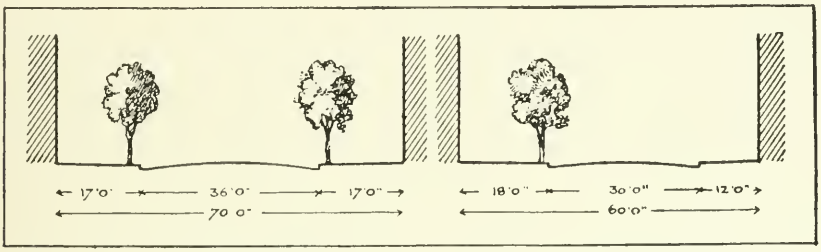


FIG. 85.—STREET PLANTED WITH DOUBLE ROW OF TREES

FIG. 86.—STREET PLANTED WITH SINGLE ROW OF TREES ON SUNNY SIDE

construction and is more pleasing in appearance (see Figs. 83 and 84). If we accepted these proportions in England we should get far wider footways than we have hitherto considered sufficient. For example, in a street 60 feet wide from building to building, or what the Traffic Commission would call a third class street, the footways would be 12 and 15 feet wide respectively.

In a street planted with trees the width should not be less than 70 feet, and in this case a good proportion would be 17 feet to each footway and 36 feet to the road (Fig. 85). If it is desired to introduce trees in streets narrower than 70 feet, they might

be planted on one side only, preferably the sunny side (Fig. 86)—the unsymmetrical arrangement is immaterial —or they might be planted in the centre of the street, an arrangement which is frequently adopted in France, and which, besides dividing the traffic, is convenient for getting into tram-cars or cabs. Where it is possible to obtain a width of 90 feet, two rows of trees and a central promenade might be formed, but where the centre planted footway is narrow the trees should be only upon one side.

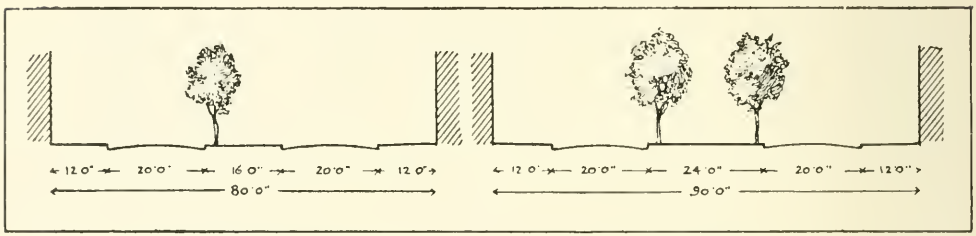


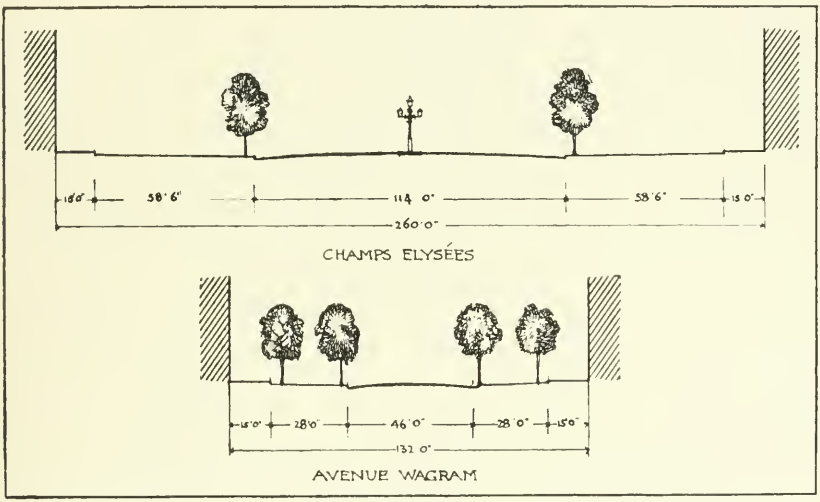
FIG. 87.—DOUBLE ROADWAY WITH SINGLE ROW OF TREES

FIG. 88.—DOUBLE ROADWAY WITH DOUBLE ROW OF TREES

A treatment that is frequently to be met with in French cities is known as the *contre allée*. This consists of a separate strip of gravel added to the footway and planted with trees: the footway, asphalted or paved, is divided by a slightly raised curbstone with gutter. The finest example of this type of street is the Champs Elysées (Figs. 1 and 89), with a total width varying from 230 to 260 feet, of which about 114 feet is devoted to the centre roadway and 58 feet 6 inches to each *contre allée*. The Avenue Wagram, Paris, in Fig. 90, is a smaller example of this type,

with a central roadway of 46 feet and double row of trees.

This brings us to a consideration of the more ornamental planted streets that add so much to the beauty of continental cities. In streets so treated it should not be deemed essential to produce a symmetrical effect; indeed, there are many positions where

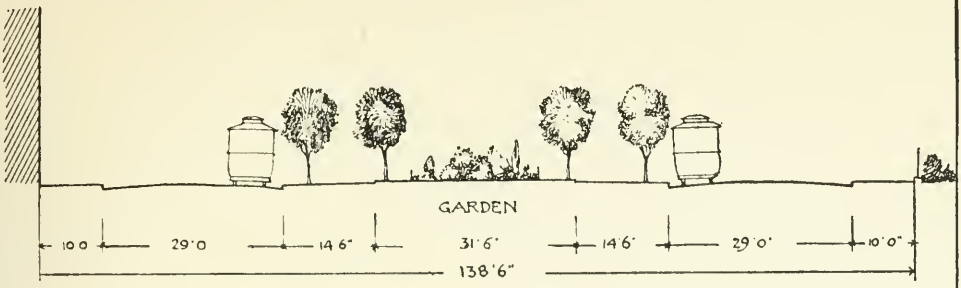


FIGS. 89 AND 90.—THE CHAMPS ELYSÉES AND AVENUE WAGRAM, PARIS

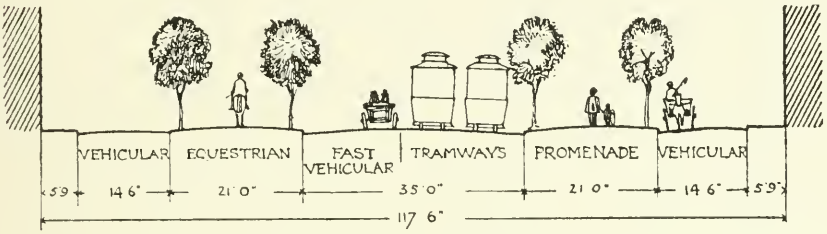
this would be decidedly wrong. If, for instance, one side of a street is occupied by houses, whilst the other side is bordered by a park, the trees might be planted only on the park side and an extra width given to the pavement in front of the houses. Figs. 91 to 100 are a few typical examples of continental planted streets. The Stübel Allee, Dresden, is 136 feet wide, with a central garden space of 31 feet, double central promenade and two footways. The Adolfs

Allee, Wiesbaden, has a central roadway reserved for motor and tram traffic, with two side roads next the buildings for slow vehicular traffic, and central promenades, one for equestrians and the other for pedestrians. The Rhein Strasse and Wilhelm Strasse in the same city show similar arrangements. Unter den Linden, Berlin, one of the finest examples in Europe, is about 190 feet in width, with a broad central promenade roadway 42 feet wide, with two side roads 49 feet wide. The Bismarck Strasse at Charlottenburg, in addition to three roadways, has accommodation for a double surface tram-line and double underground railway. The Ring-strasse, Vienna, has a central roadway nearly 50 feet wide, and two smaller roads 20 feet wide, with double avenue of trees.

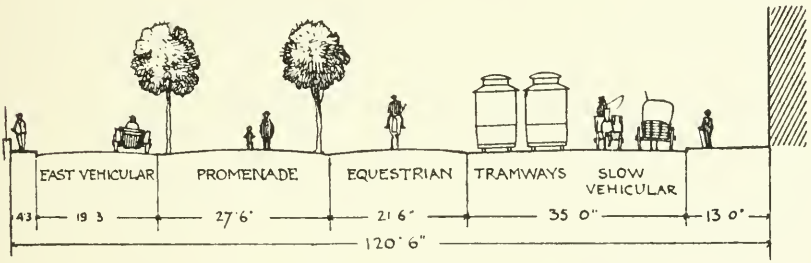
The "boulevard" or "boulvert" originally meant a bank of earth with a terraced top, and the idea of converting these fortifications into thoroughfares originated in Paris as early as 1536, when, increasing population having rendered it essential to enlarge the city, the boulevards between the Porte St. Honoré and the Porte St. Antoine were laid out. In the eighteenth century the idea became popular in other large French cities, and in the next century Vienna, Hamburg, Munich, Leipzig, Hanover, Breslau, Prague, and many other cities, demolished their fortifications and laid out the "ring" streets on the model of those planned round the inner city of Paris. The constant change in the direction, continually opening up fine vistas and producing grand perspective effects, their breadth and



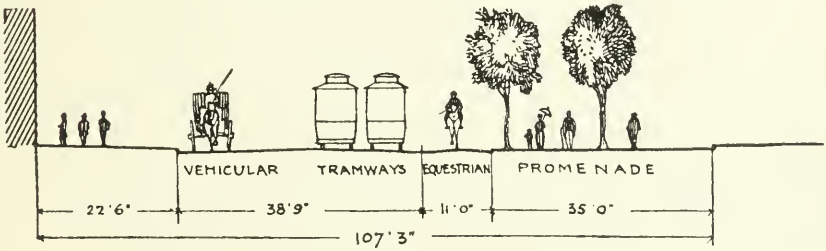
STÜBEL-ALLEE DRESDEN.



ADOLFS-ALLEE WIESBADEN.



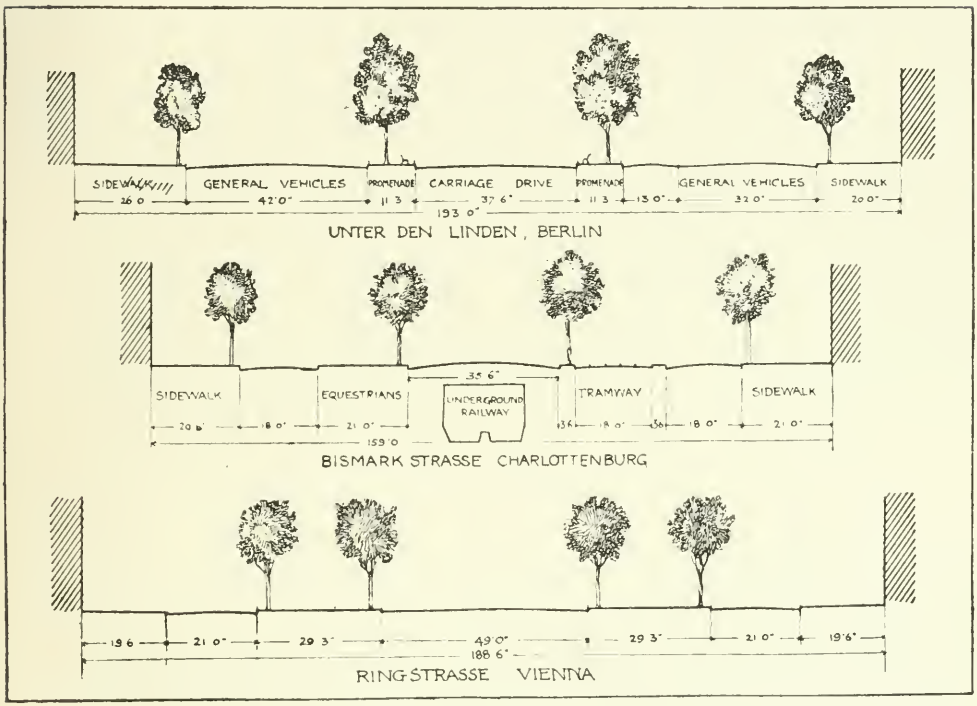
RHEIN STRASSE, WIESBADEN



WILHELM-STRASSE, WIESBADEN.

FIGS. 91, 92, 93, 94.—GERMAN COMBINATION STREETS

spaciousness, all combine to give these streets a grandiose and magnificent effect. They are the result of special circumstances, and would be impossible in England or in America. An ingenious suggestion, known as the *boulevard à redans*, has been made by



FIGS. 95, 96, 97.—COMBINATION STREETS IN BERLIN AND VIENNA

M. Eugène Hénard for dealing with the present fortifications of Paris, which since the Franco-Prussian War have been useless. M. Hénard proposes to lay out the outer fortifications, a total distance of about 20 miles, with a scheme of boulevards and small parks, the central roadway being 60 feet wide and the

footpaths each 30 feet, the building blocks to be alternately set back, forming a series of small private gardens each planted with its group of trees. Both from the hygienic and the æsthetic point of view the system has much to commend it, as the internal courts are largely done away with, and in some plans they might be almost entirely dispensed with, and although there is a loss of 12 per cent. of the amount of land covered by building (as shown in Fig. 102), the total surface of building having a direct frontage on to the road is increased by 62 per cent. Fig. 103 shows the perspective effect of such a street. The trams are of course relegated to subways beneath, and a good effect would certainly be produced by the grouping of different varieties of trees at intervals. Although, as we have pointed out, boulevards in the true sense of the word can never be constructed in England, the idea of alternately projecting and recessing blocks of buildings is worthy of consideration.

The next point to consider is the relation that should exist between the height of buildings and the width of the street. To have buildings carried to a height much greater than the width of the street spoils the proportions more than anything, and, moreover, it is sad to think of the amount of money frequently wasted in ornamenting the upper part of façades in narrow streets where such decoration can never properly be seen.

In England the tendency has always been to prevent the erection of high buildings. In London,

FIG. 98. MAXIMILIAN STRASSE, MUNICH. THE TREES KEPT WELL AWAY FROM BUILDINGS, WITH PLANTED WALKS BETWEEN

FIG. 99. AVENUE DE BRETEUIL, PARIS. A DOUBLE ROW OF TREES ON EITHER SIDE OF CENTRAL ROADWAY, WITH TWO SUBSIDIARY ROADWAYS

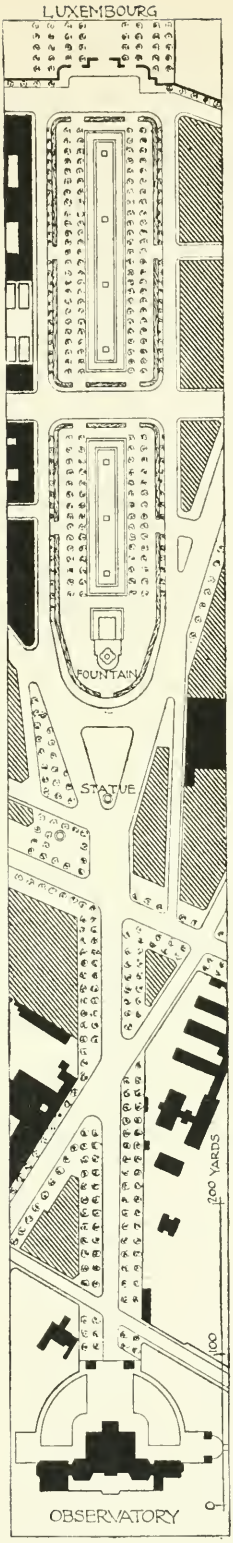
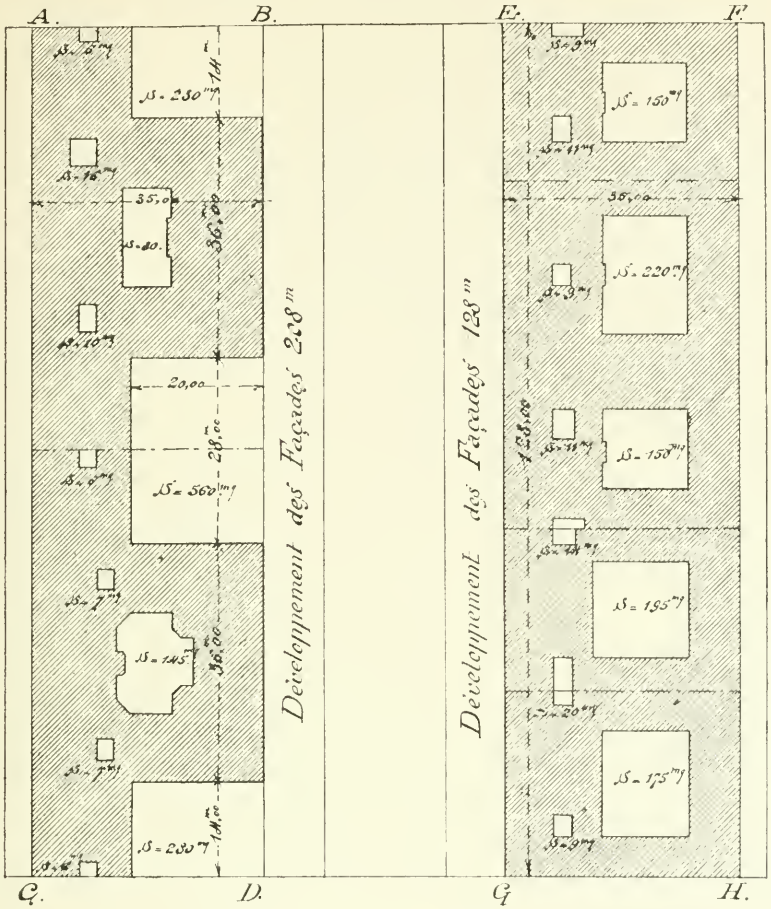


FIG. 100.—AVENUE DE L'OBSERVATOIRE, PARIS

Fig. 101. FOUNTAIN IN THE AVENUE DE L'OBSERVATOIRE, PARIS

Plan comparatif des surfaces construites



Boulevard a Redans

Surface totale ABCD = 4.480 mq

Surf. couvertes 3077 mq.

Cours ____ 225

Courettes ____ 58

Jardins ____ 1120

Total égal ____ 4480 mq

Perte sur le Terrain 12 pour %

Gain sur les Façades 62 pour %

Boulevard Ordinaire

Surf. totale EFGH = 4.480

Surf. couverte = 3507 mq

Cours ____ 890

Courettes ____ 83

Jardins ____ 0

____ 4.480 mq

E. Hénard. Arch
1903.

FIG. 102.—PLAN OF A BOULEVARD A REDANS

according to the Building Act of 1894, there is the absurd anomaly that in a street 49 feet 6 inches wide the buildings have to be the same height as the width of the street, whereas if the street be over 50 feet it may be lined with buildings of 80 feet in height. This

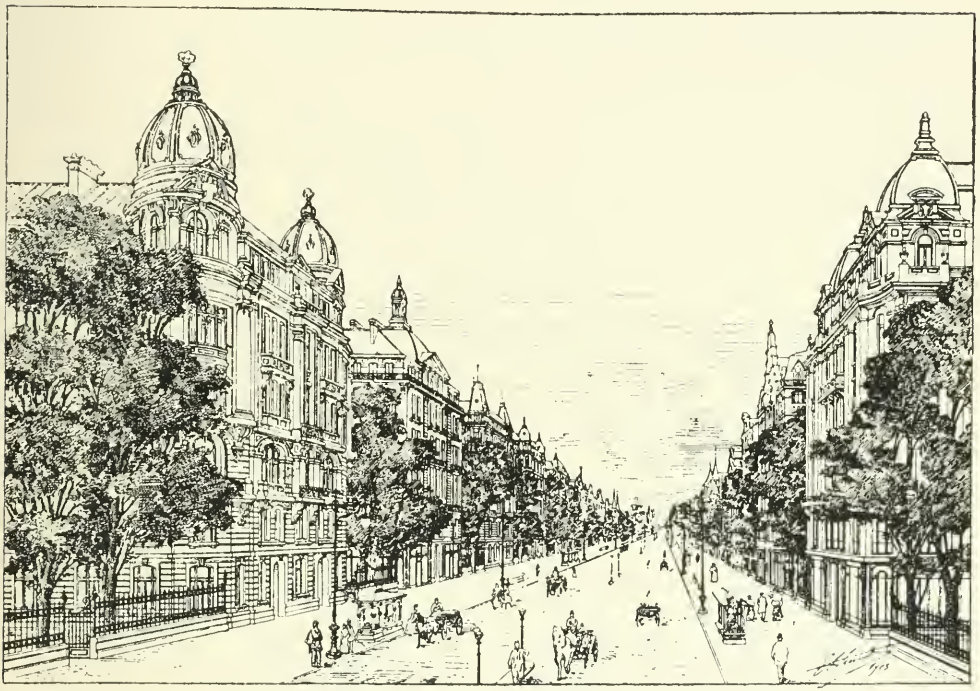


FIG. 103.—A BOULEVARD À REDANS (PERSPECTIVE VIEW)

is, of course, an absurd regulation, and one which has given rise to much inconvenience. In framing bye-laws dealing with the height of buildings it is essential to consider the relative width of the street on which they abut, and this is the line upon which most town regulations on the Continent have been framed. Thus in

Karlsruhe we find the height fixed at one and a quarter times the width of the street, in Rome at one and a half times. In some cities the proportion varies in different districts. In Berlin the height of the front wall may be equal to the width of the street, with a maximum of about 72 feet. If buildings are set back from the building line, then the height may be increased by the amount set back, but must not exceed 72 feet. In Paris the limiting height of all buildings is proportioned to the width of the street, but in addition, the roof has to be contained within the circumference of a circle of given radius.

In the United States the law varies in different cities, and in some cases there appears to be no limit of height and no ratio to the width of street. In Boston the height of buildings may be two and a half times the width of the street, with a maximum height of 125 feet. In New York houses other than mercantile and public buildings may be 150 feet in height in streets exceeding 79 feet wide, or about twice the width of the street; while in streets 79 feet wide and under the height may be up to 125 feet.

In a paper dealing with this subject [1] read before the Royal Institute of British Architects, Mr. James S. Gibson suggested that when streets are increased beyond a width of 60 feet the heights may be also increased beyond the width of the street without detriment to its architectural aspect, and proposed the

[1] See the *Journal of the Royal Institute of British Architects*, December 24, 1904.

following schedule of maximum heights for the central part of London :—

Width of Street.	Ratio of Height of Buildings to Width of Street.	Approximate Lowest Buildings.	Approximate Highest Buildings.
40 to 60 feet	1·000	40 feet	60 feet
60 to 80 feet	1·125	67 feet	90 feet
80 to 100 feet	1·250	100 feet	125 feet

For streets outside the central area and within a three-mile radius the heights should be equal to the widths of the streets, whilst outside the three-mile radius the heights should be less than the widths of the streets, with a maximum height of ·75 of the width for streets of 100 feet wide. Such rules would have the good effect of producing variety in the heights of the buildings.

From the æsthetic point of view high buildings seem to be less suited to a broad thoroughfare than to a narrow one, and here the æsthetic idea is opposed to that of hygiene.

As to the length of street, Herr Stübben points out that from a traffic point of view a street should be continued for as long as possible in a straight line, but from a hygienic point of view a long straight street, particularly when it happens to be laid out in the direction of the prevailing wind, can become very unpleasant on account of driving dust. From the

æsthetic point of view a short street is preferable to a long one, and as in the case of buildings, certain proportions are known to be agreeable, so in the case of fine streets the length should bear a certain proportion to the breadth. The Linden in Berlin and the Hohenzollern-ring in Cologne, both well proportioned streets, have a proportion of 50 to 1,000 and 36 to 700 mètres respectively. The general proportion of 1 to 25 may be considered as being a good one. Streets of a monumental character should not be laid out in one continuous length for more than three-quarters of a mile, as beyond this the eye is unable to distinguish the focal point in which such streets should generally terminate.

The necessity for ventilating streets, from which the houses on either side draw to a large extent their supply of fresh air, must be obvious, for not only do the houses draw their air from the streets, but most of the inhabitants take their exercise there. The decomposition of horse manure, the refuse pails, bad smells arising from sewer ventilation directly into the streets, are all pollutions of the atmosphere for which ample and efficient ventilation should be provided. Moreover, the increasing use of motors and all kinds of machinery has a vitiating effect on the atmosphere; the effect of motor traffic in stirring up germ-laden dust is becoming a serious matter. It may be that in years to come we shall be obliged to return to the custom of the ancients and construct our houses with their windows away from the streets, like those at Pompeii.

Dangers from inadequate ventilation arise also from the enclosed spaces formed by the houses in four streets backing into a kind of internal square, generally very badly ventilated. The only entrance to such spaces is often by an archway, in which case there can be no through current of air or cross-ventilation. The importance of the wind sweeping down the street is most appreciated during foggy weather, when there is little air stirring. Public squares are generally speaking well ventilated, because, there being almost invariably a street at each corner, and sometimes two, every opportunity is given for cross-draughts. The ventilation of streets may be much improved by an irregularity in the heights of the buildings; when one building is carried up much higher than those surrounding it, the wind striking against it is diverted and carried down to the ground. High buildings might therefore well be encouraged within reason and in selected positions.

A suggestion has been made by Mr. Halsey Ricardo[1] that streets might be constructed as shown in the diagram (Fig. 104), that is to say, with the ground-floor walls of shops set back to enable gazers to view the goods from the outside, sheltered by the projecting first floor, which stands out beyond the frontage line a bow-window's width. The third floor resumes the frontage line, and the flat set-back is used as skylight, to increase the lighting of the top showroom. Above come residential quarters, each floor with a wide terrace, which would add to their attractiveness

[1] See *The Builder*, December 1, 1900.

and so compensate for the loss of area in the two top floors. Comparing this section with that showing streets as at present planned in conformity with the London Building Act, it is evident that the air in the streets would be more easily changed, and the dotted

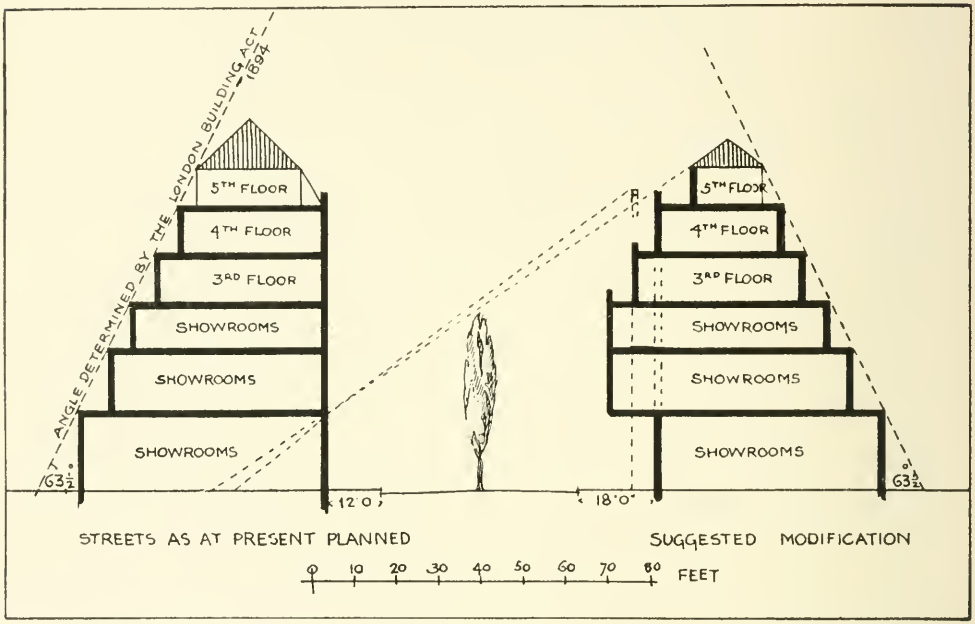


FIG. 104.—SUGGESTION BY MR. HALSEY RICARDO FOR PROJECTING THE LOWER STOREYS AND SETTING BACK THE UPPER STOREYS OF BUILDINGS

lines show that the sunlight would penetrate further into the ground-floor showrooms. The suggestion might be of value in the case of street widening, especially in old towns, as it would permit of an added width of perhaps eight to ten feet to the street without the cost of entirely rebuilding. Thus new buildings could be so set back for say twenty years, which

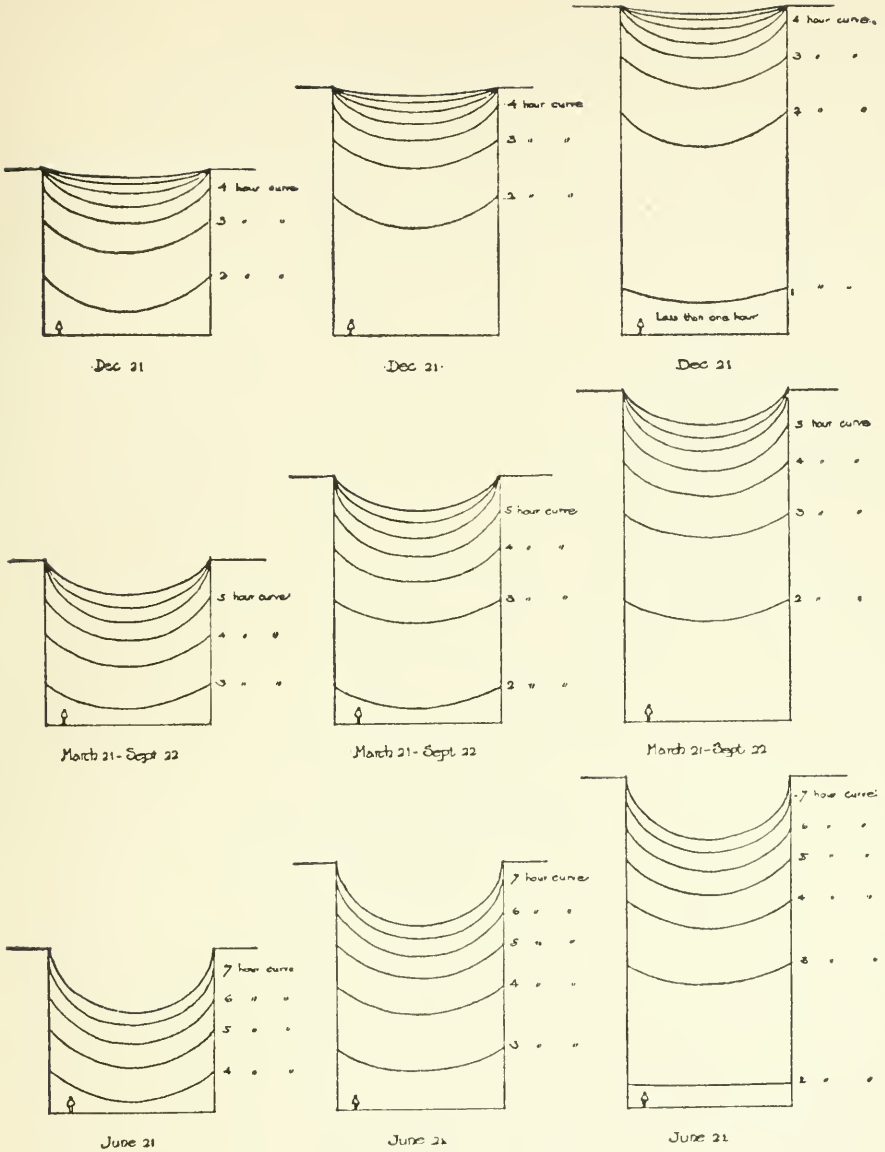


FIG. 105.—STREET ILLUMINATION

Diagrams representing the cross-section of a street running north and south. In the left-hand column the height of the buildings is equal to the width of the street; in the central column one and one-half times the width of the street; and in the right-hand column twice the width of the street.

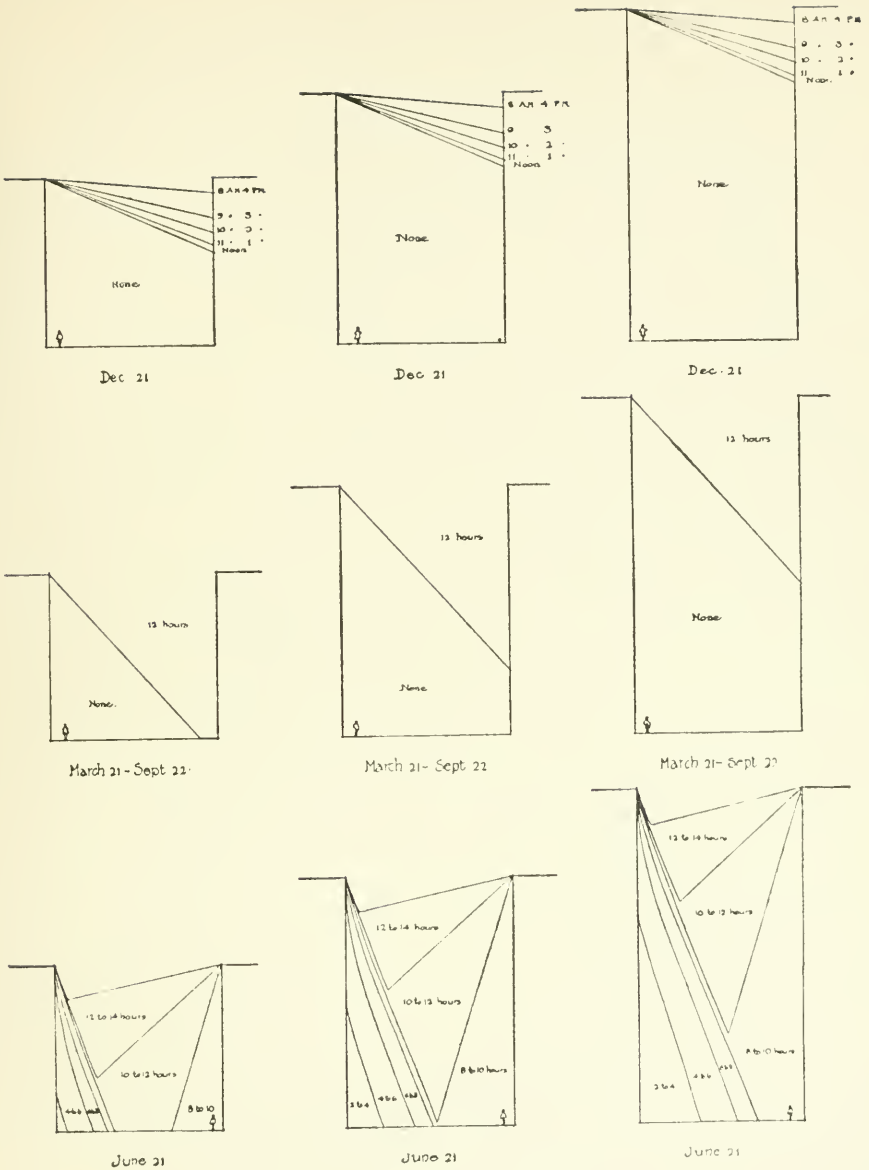
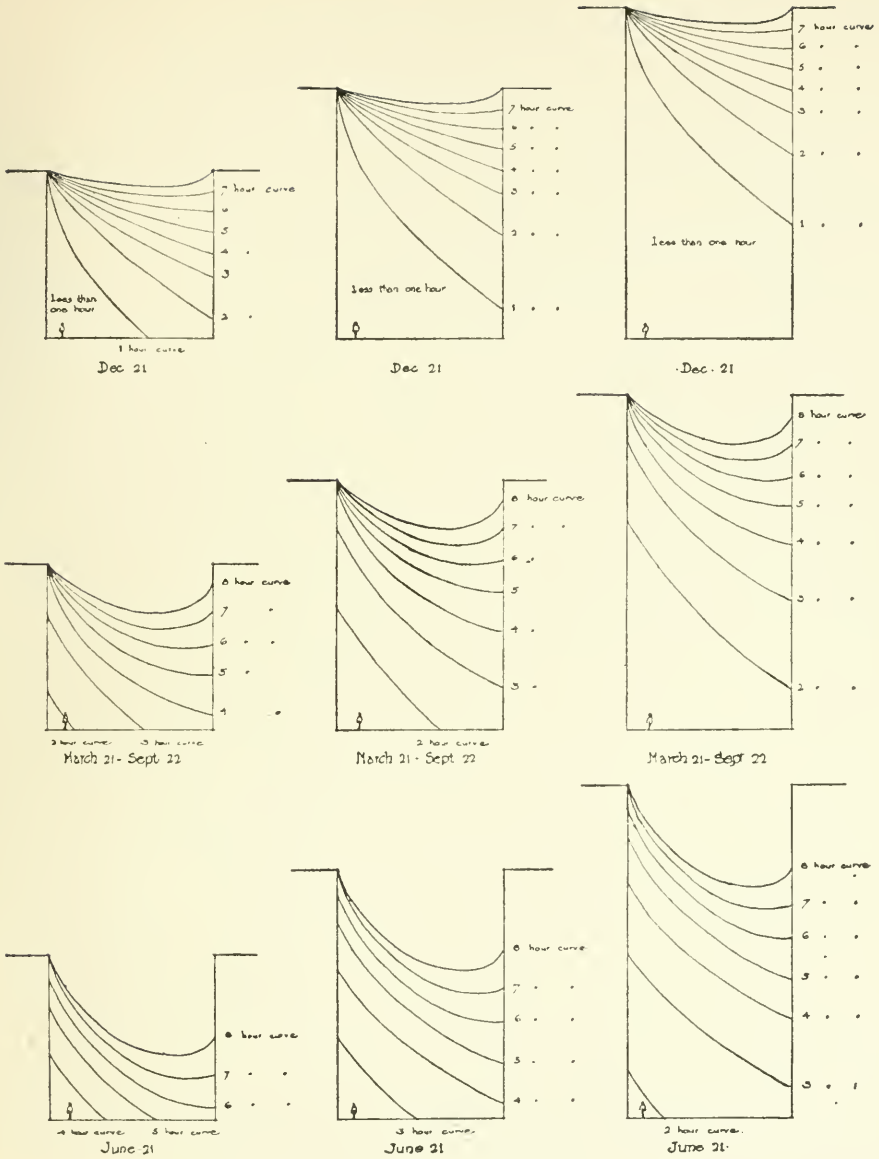


FIG. 106.—STREET ILLUMINATION

Diagrams representing the cross-section of a street running east and west, looking west. The height of the buildings bears the same relation to the width of the street as in the preceding diagram.



107.—STREET ILLUMINATION

Diagrams representing the cross-section of a street running south-east and north-west, looking north-west, or of a street running north-east and south-west, looking south-west. The height of the buildings bears the same relation to the width of the street as in the two preceding diagrams.

should be a considerable economy in the payment of compensation.

The orientation of buildings and streets with regard to sunlight has hitherto not received such attention as the subject merits. According to the reports of the International Congresses of Tuberculosis and Hygiene held a few years ago in Paris, the importance of placing buildings so that their façades should receive the rays of the sun for as long a time as possible was strongly urged. To obtain this result it is obvious that we ought to orientate the streets, determine their width and fix the height of the houses, so that the access of the sun's rays should be assured.

In America research upon this subject has been made by Mr. William Atkinson, by whose courtesy I am able to give a brief *résumé* of the work as far as orientation of streets is concerned. He points out that in the study of streets there are two matters to be considered, sunlight and skylight. The direction of the street affects the sunlight particularly; the height of the buildings upon it affects both the sunlight and the skylight. Skylight comes from all directions of the heavens; sunlight from only one direction.

The distribution of sunlight in streets running (1) north and south, (2) east and west, (3) south-east and north-west, respectively, for the four typical periods of the year is shown in Figs. 105, 106, 107. The amount of sunlight in the street is represented by means of curves, the method of obtaining which for a street running south-east and north-west is shown in Fig. 108,

representing the cross-section of a street: the dotted lines show the direction of the sun's rays at nine a.m. and eight hours later at five p.m. The point (at

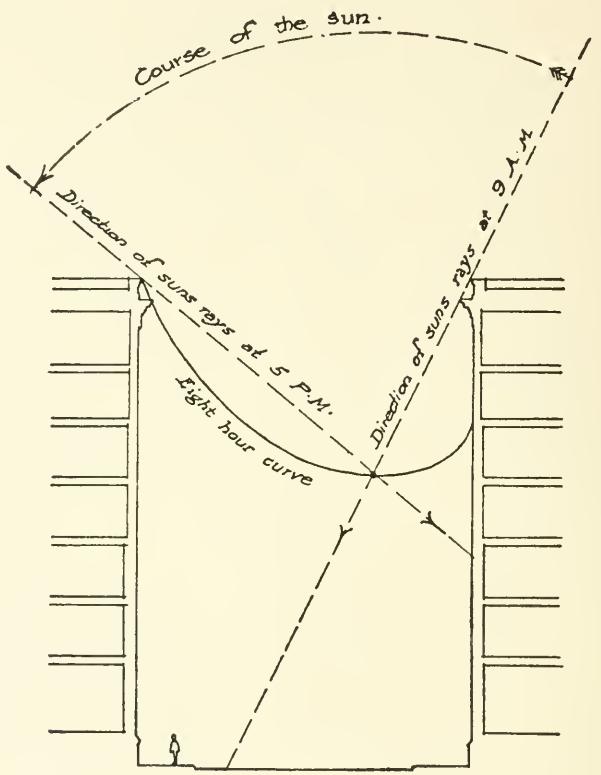


FIG. 108

Diagram illustrating the method of obtaining the light curves of the three preceding diagrams. Street running south-east and north-west, looking north-west.

the intersection) comes into sunlight at nine o'clock and into shadow at five o'clock. In other words it has been in sunlight for eight hours. If we connect a series of such points we shall have our curve, in this case the eight-hour curve. The curve is a con-

venient way of representing the amount of sunlight. It enables us to present in a single diagram a result obtained from a great number of separate diagrams.

Now in the first place it will be seen that the street running east and west is the very worst of all in winter (Fig. 106). Notice the direction of the sun's rays at noon. They penetrate a very small distance down into the street. In summer, when the sun is more nearly overhead, the street gets a great deal more sunlight. It is a street of extremes—cold in winter, hot in summer. The diagonal street is very much better off. The north and south street receives in winter the greatest amount of sunlight; at other times of the year the diagonal street is nearly equal to it. In a system of streets running at right angles to each other, the best method is to lay out the diagonals south-east–north-west and south-west–north-east. In most American cities the streets are laid out north and south, east and west.

Where the buildings are high in proportion to the width of the street, the light at noon comes only a short distance down from the top. Where the buildings are equal in height to the width of the street, on the average day of the year, at the time of the equinoxes, in a street running east and west the sun's rays will fall upon the ground surface at about the edge of the sidewalk. Of course, as the latitude varies the diagrams will vary, those shown in Figs. 105–107 being all drawn for the latitude of Boston (42° 21′ N.). In England, although in summer the days are very

much longer, the sun travels very much nearer the horizon.

Although it may not often be possible to follow the rational method of laying out streets which Mr. Atkinson advocates, much benefit would be secured if more attention were devoted to determining the direction of streets in new areas, and to see that they were laid down as much as possible in such direction that a purely northern aspect is avoided, which is the case where roads run east and west. Where, however, this cannot be prevented, in suburban districts consisting of small houses, it should not be difficult to plan the houses on the south side of the road so that the principal living rooms face south and the kitchen, &c., face north. At present we frequently see the houses on both sides of the road erected on identical plans, and we can recall a case in which a really fine open view is overlooked by nothing better than a long series of kitchen and scullery windows, for want of a little imagination on the part of the builder.

The connecting of various levels in streets, either by means of stairways, or ramps, or combinations of both, often affords opportunities for adding interest to a town, and should be not only useful but also ornamental features. How they can be made such may be seen in the hillside towns of Italy and Spain; the well-known Spanish stairway in Rome, connecting by means of 125 steps the Piazza di Spagna with the higher level of the Via Sistina above, is a particularly good example. The ramps connecting the

Piazza del Popolo with the Pincian Hill, or those upon either side of the Friedens Denkmal at Munich (Fig. 109), are examples of a pleasing treatment of roadways; in both these cases the ramp is partly disguised by judicious tree planting. In the case of ramps to bridges, those planned as a continuation to the bridge line are much to be preferred, but where

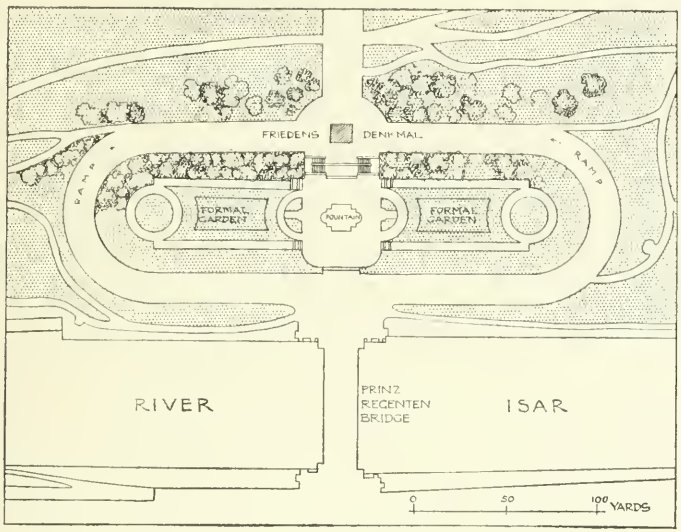


FIG. 109.—FRIEDENS DENKMAL PLATZ, MUNICH

this is impossible on account of the height, a double ramp generally affords more scope for treatment than a single one; but this question is one belonging more to the subject of bridges, which we do not propose to include in the scope of the present work.

Let us now turn our attention to the architectural treatment of the street itself, of the buildings which line it, and on which its architectural character depends.

In this country the interests and rights of the individual are so jealously guarded that improvements are always most difficult to effect, and street architecture has hitherto been allowed to take care of itself too much.

Street architecture is social architecture, and ought surely to conform to those rules of convention by which all society is governed. It should not be possible for any one freeholder to erect some vulgar monstrosity as an advertisement, when by such building he entirely destroys the artistic harmony of the street. There is an ever-growing need for a cultured and wide censorship, as liberal as possible, that will prevent the erection of the hideous and purposeless buildings that so often disgrace our streets. There is as yet no sufficient standard of public taste to entrust such censorship in the hands of public officials, but with such a number of societies devoted to the encouragement of the fine arts existing throughout the kingdom, there should be no difficulty in obtaining expert assistance to form committees of advice. "The subject," says Professor Beresford Pite, "is one of great difficulty and complexity, and unless the control is in the first place wisely directed in the true interest of successful architecture by highly competent hands, and in the second is so entirely firm by enactment and covenant that it cannot be broken away from, the experiment will not be successful."

The first question with regard to street architecture which we have to ask ourselves is, How far is it desirable to insist upon architectural uniformity and

symmetry and to call upon owners to conform to any general style of building? The question is one on which there will be endless differences of opinion and in regard to which it is not easy to formulate any principle that will equally suit all classes. Style in architecture is largely a matter of fashion; thus a century ago it was generally accepted that a street should form a design as a whole, and we had in London such examples as Regent Street, the Adelphi, and many other streets. As the nineteenth century progressed, the Gothic Revival movement led the sympathies of architects and artists to favour a more picturesque treatment. Now we have for some few years shown a marked tendency to return to classic forms. "It must not be imagined," says Professor Reilly, "that there is no scope for the picturesque in civic architecture. The very supposition is absurd. The real fact is that the picturesque is properly inherent in the site and cannot be artificially brought about. It would, for instance, be impossible for Edinburgh with its rock to be anything but picturesque. But on a plain the right treatment of plan is a broad symmetrical balancing of effects."

There are some positions, as, for example, a street leading to an important architectural termination, a circus or a geometrically laid out curve, where a great deal is to be said in favour of the uniform treatment of the whole in subordination to one design. The sweep of a curve seen against the skyline, should be unbroken, save by small details such as chimneys, and

in this case a symmetrical treatment of the street façade is the only one likely to be successful. The beauty of a circus or quadrant depends entirely upon the surrounding buildings being kept at one uniform height. If it is not so treated the best quality, the continuity of the curved line, is lost. Again, when a street is of more than average width, is not very long, and is to be occupied entirely by buildings of one class, a uniform design gives a dignity which no other treatment can impart. Where it is decided to adopt such a uniform scheme in a street of business buildings, the objection that is generally made is that here and there an elevation may be provided which is unsuitable to the requirements of the tenant; but this is a difficulty that would occur whenever the property was vacated, and yet buildings are not pulled down to suit each successive tenant, and in these days of short leases such consideration should not be allowed much weight, when the question is one of spoiling a scheme that depends entirely upon the continuity of its architecture. To preserve a symmetrical effect it is of course not essential that each building should be an exact repetition of its neighbour, for this always produces a dull and uninteresting effect, but rather, an effort should be made to obtain a symmetrical arrangement by blocks of similar design, and monotony in detail should be avoided by minor variations in the elevations without destroying the design.

One very practical objection to regularity in large schemes of street architecture is much in evidence in

FIG. 110 UNIFORM ARCHITECTURE ON A CURVED PLAN. DESIGN FOR THE QUADRANT, REGENT STREET, BY MR. R. NORMAN SHAW, R.A.

the wealthier parts of London, where we find rows of uniform houses painted different colours according to each individual owner's fancy, thus destroying all harmonious effect.

With the exceptions we have indicated, the picturesque variety of architecture that characterises our modern streets should not be discouraged. In what may be termed ordinary streets, which do not demand a grandiose effect, an irregular is often preferable to a regular treatment, and is more expressive of the needs of the street, especially if it be a business one. Again, where a street is comparatively narrow, the architectural treatment as a complete design can hardly be a success, as it can never be seen as a whole. In positions dominated by some ancient Gothic building a straight uniform treatment would be quite out of character.

Given that in certain prominent positions it is desired to obtain a fine monumental effect by means of a more or less uniform treatment, what means should be taken to ensure an efficient control of the architecture? Why is it that Paris has that grandiose air which makes it seem a city so much more in the full sense of the word than London? It is true she has a great advantage in being surrounded by magnificent quarries of fine white limestone underlying the soil for miles in every direction. But this alone would not prevent her fine squares and streets being spoiled, if it were not that a street supervision is exercised wherever the importance of the position demands it.

The buildings of many of the principal streets and squares are under a servitude, that is, an official control to which all private owners must submit, and which is well known to the buyer when he purchases the property.[1] If we are able to control the height of buildings and width of roads and the construction of drains, it should be possible for the most important streets and squares of our great towns to be scheduled and officially controlled in some such way, by a committee of experts (as in America), to whom all questions of taste could be referred.

To some extent the London County Council are alive to the importance of official control, and in regard to the architectural features of Kingsway their Improvements Committee in 1900 advised that "measures should be taken to insure harmony, though not perhaps similarity of design, in the architectural treatment of the buildings to be placed upon the frontages of the new crescent and on the northern side of the Strand, and perhaps in the main thoroughfare itself." This was a step in the right direction, and had the Council's powers been greater, a more comprehensive treatment would have been the result. But unfortunately the Council had not sufficient backing up from public opinion to carry through their

[1] The following places amongst others are under the protection of servitudes: the Place Vendôme dating from the time of Louis XIV., the Place des Vosges from 1605, the Place des Victoires from 1691, the Rue Royal from 1757; and for the Rue de Rivoli, the Rue Castiglione, and the Place du Palais Royal the servitude was fixed by consular decrees of Vendémiaire 17 and Floreal 1, Year X.

FIG. 111. TERMINATION TO A STREET VISTA, PARIS

good intentions, and they let slip the opportunity for a stately and symmetrical design in Aldwych and Kingsway; and although their intentions at the first—by instituting a competition for designs—were excellent, they failed in several important points, principally in imagining that amongst the eight designs they obtained from prominent architects it would be possible to combine parts of each into one whole. It would have been infinitely better to have selected one of the eight designs and adhered to it entirely. But the whole proceeding shows that the Council agree with the principle of exercising an official control when advisable, and let us hope the comparative failure of Kingsway will not deter either London or provincial towns when the next great opportunity occurs.

It has been the custom in Paris for some years past to institute competitions and award prizes to those architects who design the best street façades during the year. The idea is a good one, and attracts much public attention each year. When a new street is to be opened up, definite encouragement to good building is offered by awarding prizes to the best designs for buildings about to be erected in it. Paris not only gives a prize to the architect, but grants a remission of part of the street tax, that is, of the rates, to the owner of the building. No such direct encouragement to build beautifully has ever been proposed, as far as we are aware, in England, nor would it be much use unless we accepted the system of trusting the awards to juries of experts.

Another idea which we might very well adopt from

where in the background, but we cannot afford to have our best streets marred in this way, and the Office of Woods and Forests have set an excellent example in Regent Street by insisting that the architectural effect of a magnificent street should not be entirely ignored. There are signs that a great improvement in the treatment of shop-fronts is taking place, and that there is a strong tendency to replace the shop-front of the last half-century, with its sham construction and immense sheets of plate glass, by something better designed and carried out with greater architectural taste. In the best German examples of shop-fronts we find more importance attached to the emphasis of vertical uprights, and perhaps for drapery establishments and the like this method is the best. In places where it is not advisable to employ an arched form, the method is often adopted of recessing the actual front or the central part of it, and leaving a vestibule with show-cases on either side. This is an architectural effect capable of great variety of treatment, and is much to be commended. It should also be possible to decorate the steel girder of a shop-front in such a way that it would not be necessary to box it up with a sham cornice of wood or stone.

The street arcade is a feature with many merits both as regards architectural effect and convenience to the public, and much may be said in its favour, both from the point of view of the shopkeeper and also as affording fine scope for architectural effect. It is especially to be found in cities where it is desirable to afford plenty of shade. At Bologna, for example, there

are several miles of such streets or arcades, and they are to be met with in nearly every town in Italy. It is worth considering whether the street arcade might not be more adopted than it is in the planning of streets and towns of the future, especially where the land is increasing enormously in value. If, for example, in the case of widening a street in England which runs east and west (and where the south side gets no direct sun in consequence), instead of purchasing land at great expense upon both sides of the road, it might sometimes be possible to confine the purchase to the south side, and then only to the ground-floor premises supporting the floors above, by constructing an arcade, thus adding to the width of the roadway by the width of a footpath; the saving in expense would be enormous, and in the event of buildings being reconstructed at a later date they could then be compulsorily set back. Within the last few years the arcade has been tried once again in London at the Ritz Hotel in Piccadilly. A rare example is to be found in the "Rows" at Chester, where two rows of shops with an open arcade in front are placed one above the other with admirable effect. The system of arcades is said to be objectionable on account of making the shops dark. But in the Rue Castiglione and adjoining streets in Paris (Fig. 112) this is not the case to such an extent as to cause any real inconvenience, for the arches are kept at such a height that they do not shut out all direct sunlight.

Where a street has a certain monumental effect, depending upon the continuation of the style of architec-

Fig. 114. CONNECTING BRIDGE, GOVERNMENT OFFICES, WHITEHALL

ture from one block of buildings to another, the use of archways or colonnades might be more general than it is. The rental value to a town would be an important consideration where land was of value. The only objection to colonnades is that they partially impede a thorough ventilation of the street, but from an æsthetic point of view they have much to commend them. We find them used with splendid effect at Verona, where, in the Piazza dei Signori (Fig. 117) finely proportioned arches are thrown across two of the streets entering the place and serve to enclose the square. There are several fine examples in London of such a treatment, notably at Somerset House, where the river front joins on to King's College, and another excellent example is to be seen in the new Government buildings at Whitehall (Fig. 114).

It is curious that in England so little use has hitherto been made of the covered street. There does not exist a single good example. The Burlington Arcade, London, which is perhaps the best, is insignificant when compared with such fine examples as the Galleria Vittorio Emanuele in Milan or that at Naples. Such covered passages in the midst of large towns are particularly suitable for many kinds of trades, but it is essential that they should be planned in the direct line of a pedestrian traffic route. They should be broad (that at Milan, for example, is 50 feet in width) and airy, taking in the first and second floors of the buildings on either side, and also well ventilated. Among the more important covered passages

on the Continent are the Kaiser-passage in Berlin, planned in a broken line 25 feet broad and 400 feet long, and the Galleria Mazzini at Genoa, 35 feet broad and 600 feet long.

Both in Great Britain and the United States, streets and open spaces are less furnished with trees than on the Continent, and foreign visitors to London are often struck by the curious anomaly that whilst our parks have received so much attention and care, hardly any of the important streets of London, with the exception of the Thames Embankment, are planted with trees. Paris, Berlin, and Vienna, on the other hand, do all that is possible to introduce a fresh greenery into their streets, and in the former city there are no less than 80,000 trees. This lack of trees in the streets is more curious in a country like England, where, on account of climate, cultivation is so easy, and where private individuals spend so much thought and money on their gardens.

It is obvious that both from a hygienic and æsthetic point of view great benefits accrue where tree planting in streets is carried out on a systematic plan, without overcrowding, and by keeping the trees within reasonable bounds.

As trees breathe not only by their leaves, but also by their roots, it follows that it is difficult for a tree to be in a healthy condition in positions where the ground is hard, and for this reason they thrive better when placed in the middle of the street rather than on the sidewalks; it is better still to provide a narrow strip of grass, as is invariably done in the finest streets in

French and German cities. Another reason why trees should be planted in the middle of the street rather than at the curbs is to shade the street without interfering with the light and air of the adjacent houses and obstructing their view. At the same time they may be of service in dividing the traffic. Of course, a greater width of roadway is needed to make the system practicable, but it has the one great advantage of allowing a larger amount of sunshine to penetrate to the houses, and the cost is lessened by having fewer trees, whilst the appearance of the street is quite as good. That trees are not in the way on a broad business street, and with care may be made to thrive there, is shown by the tree-planted boulevards of Paris and Marseilles.

An important point which is sometimes rather overlooked is, What is to be the future of the forest trees planted on the verge of so many of the footways? These may be delightful whilst of reasonable height, but when allowed to grow as they list they easily become a nuisance. Even the attraction of green boughs is a doubtful gain to the inhabitants of any thoroughfare if air and sunshine are shut out from their windows for half the year. We appear to be too much afraid of pruning them and keeping their growth within reasonable bounds, and in this respect we might well follow the lead of some towns on the Continent, where trees are not allowed to grow more than about 30 feet high, and are then generally cut in quite a formal way. Another mistake often made in England is that the trees are planted too closely together, and are not sufficiently

grouped. Where they are planted equidistantly they should never be less than 30 feet for birch and small growing trees and 35 to 40 feet for the larger kinds.

It would be far better if, instead of planting trees in long rows on the sidewalk, they were irregularly grouped at intervals, and where possible kept entirely subservient to the architectural features of the street. Where it is desirable to accentuate the position of an important building, trees may well be omitted from its front, or if allowed should be kept quite low, not to impede a view of the building from the opposite side of the street. Sometimes, instead of being planted on the sidewalk itself, they might be planted in the gardens of adjoining owners; it would not be a serious matter to run the risk of these trees being occasionally cut down, and if a few owners objected to having trees in their gardens, so much the better, as instead of the monotony of a long row we should get the more pleasing effect of irregular groups.

Before deciding what trees to plant it is best to make a close inspection of all existing trees in the neighbourhood, and those in a flourishing state suitable for roads should be noted and planted. The following list, together with the soils most congenial to their growth, is suggested by Mr. Francis Smythe. The first on the list, the plane, is undoubtedly the finest tree for road planting where the subsoil and other conditions are suited to its growth.

Plane occidental ...	London ...	Heavy soil
„ maple leaved ...	„ ...	„
Maple	Norway ...	Any soil
Sycamore	„ ...	„
Oak	Turkey ...	„
„	English ...	Heavy soil
Poplar	Canadian ...	Any soil
„	Ontario ...	„
„	Balsam ...	Heavy soil
„	Black Italian ...	Any soil
„	Lombardy ...	„
Elm	Camperdown ...	Heavy soil
„	Scotch or Wych	„
Lime	European ...	Light soil
„	Crimean ...	„
„	Red-twigged ...	„
Birch	Common ...	Any soil
„	Silver	„
Ash	Common ...	„
Willow	„ ...	Moist soil
„	White ...	„
„	Huntingdon ...	„

Trees for manufacturing or smoky districts: planes, Norway maple, sycamore, poplars, ash. Trees for cold, exposed positions: all the trees mentioned except planes and limes. Trees for seaside: sycamore, Norway maple, Turkey oak, Camperdown elm, grey poplar, white willow, common ash. Trees for chalk soils: Norway maple, sycamore, poplars, birch, ash.

Generally speaking, when gardens are planned at the sides of streets or at their junctions, the best effects are obtained by very simple means. Their plan should only be laid out on the most formal lines. We find the mistake continually being made of introducing little sinuous paths and beds with

injudicious and trifling garden ornament, which tend to destroy the dignity of a street, and certainly do not add to its beauty. The best effects are produced on strictly formal lines, with unbroken grass spaces and stately avenues of trees. The more general introduction of flowers would be a great advantage to our streets, if positions could be found for them where they could not easily be plucked. They would, of course, suffer a great deal from the dust, and would often need renewing. In Paris baskets of flowers are sometimes attached to the electric light and other standards at about fifteen feet from the ground. Those who have noticed the gorgeous effect of the flower-sellers' baskets grouped round the base of the fountain at Piccadilly Circus, or on the steps of the Piazza di Spagna, in Rome, will admit that the charm of such a beautiful colour effect is worth striving after.

CHAPTER VI

THE PLANNING OF SQUARES AND OPEN SPACES

IN the early days of every ancient city the place of public resort was the market-place. In Greek cities this place was known as the *Agora* and in Roman cities as the *Forum*, but from the various accounts given by ancient writers of the purposes for which they were used it does not appear that they differed very considerably either in their intention or their form. The early types were open, and often traversed by streets, as, for example, the public place of Elis, mentioned by Pausanias, who says that it was quadrangular and was called a hippodrome because used for horse races. The later types were confined within continuous porticos. The *Agora* was the place in which public assemblies were held, as well as a market for the sale of goods; in this respect it resembled the market-places of English country towns; and the situation of the Town Hall recalls the use of a portion of the portico for the purpose of a tribunal,

as at Megalopolis and Athens. Aristotle deprecates this dual use of the *Agora*, which, he says, should only be used as the public meeting-place and for the display of beautiful works of art, and to which all slaves, artisans, and labourers should be denied access, whilst the market should be in another part of the city and of easy access to all the means of transport, both by sea and land. According to Vitruvius the Greek *Agora* was generally square, with a spacious and double colonnade ornamenting it, the columns placed at narrow intervals, and above, a gallery for walking, with balconies and more shops, the letting of which formed a source of public revenue. He says that the Roman *Forum* differed from that of the Greeks, inasmuch as, until the erection of amphitheatres, exhibitions of gladiators were held there.

As towns grew into cities it became necessary to make provision for a number of public places, and this led to their being divided into two classes. The principal class of *fora*, the *fora civilia* or *judicaria*, became great assemblages of public buildings dedicated to religion, law, and justice, as those of Julius, Augustus, Nero, and Trajan at Rome; while the other class, the *fora venalia*, still continued to be markets; thus the *forum boarium* was the market for cattle, the *olitorium* for vegetables, the *piscarium* for fish, the *coquinium* for ready cooked vegetables, &c.

The principal remains of Roman *fora* are those at Rome itself, at Pompeii, and at Timgad and other colonial towns that have been excavated in North Africa.

The best preserved is that at Pompeii (Figs. 11 and 13), which is in such a condition that there is no doubt about the use of the various buildings and monuments that surround it. It is oblong in shape, about 175 by 50 yards, dominated on the north side by the temple of Jupiter, the other sides being enclosed by colonnades. The area in the centre was open to vehicles, though it was not paved in the same manner as the streets, but was covered with large regular slabs of marble. Numerous statues were erected round the sides, and twenty-two bases for these statues are still preserved, five of which bear inscriptions dedicated to officials of high rank. Remains of iron gates were found at several of the entrances, from which it may be inferred that the Forum was only open during fixed hours. The recesses may still be seen in which the public measures stood; five of them have sliding bottoms for grain, and four were fitted with tubes for oil and wine.

In their colonial towns, and especially in their military camps, the Romans always placed the Forum at the intersection of the two principal axial thoroughfares, the *cardo maximus*, running from north to south, and the *decumanus maximus*, running from east to west. The Forum at Timgad, a military colony founded under Trajan, is an excellent example of the traditional type established in an entirely new colony. It is almost square in plan, entered from the principal thoroughfare by an archway, and resembles an Eastern *meidan*, or bazaar, like those to be found at Cairo and

Constantinople. A large basilica occupies the greater part of one side and opposite are the *curia* and a small temple. In the South of Europe, and especially in Italy, public places still conform to the type of the ancient Forum. They have kept their place in public life, and their natural relations with the buildings that surround them are still easily discernible. Then, as now, there was a tendency to concentrate the important public edifices, and to ornament the centre of the common life with fountains, monuments, and statues which in the Middle Ages and the days of the Renaissance were the joy of every city. Here the circulation of traffic was the most intense, public *fêtes* were celebrated, representations and official ceremonies took place, and laws were enacted.

The "place" of mediæval and Renaissance times is the direct descendant of the ancient Forum. We use the word "place" because it gives a more accurate idea than the word "square," which in its implied regularity is rather inaccurate, especially as the mediæval place was neither regular nor square. But, in spite of their apparently aimless irregularity, if we carefully examine the plans of some of these mediæval places we shall find that they were often constructed upon definite principles. They generally owed their shape to the position of some public building, and were planned to give the greatest effect to it. In Italy it may have been a church, and in Northern Europe it would have been more probably a town hall, but in either case it was the *raison*

d'être of the place, and it was not until the seventeenth century that a place was deliberately planned, either as a forecourt to a building or for the better distribution of traffic. When we find the building standing quite free and unattached, it is rarely planned symmetrically or upon any axial line, but is rather placed at one side, or angularly, thereby often gaining in picturesque effect. We frequently find a

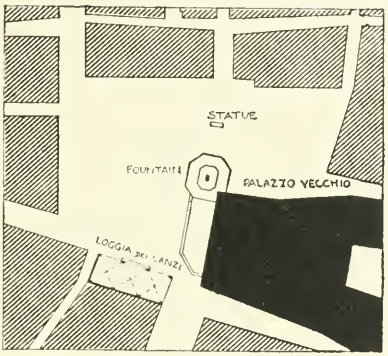


FIG. 116.—LA SIGNORIA, FLORENCE

tendency to create oblong places rather than square. The oblong form is especially valuable where the principal building occupies the shorter end, as by this means a proper perspective is afforded. Sitte divides these mediæval places into three great types. First, the Cathedral place, dominated by some great church with its campanile, baptistry, or episcopal palace. Secondly, the Signoria, or place for the reigning prince, forming a sort of courtyard to the palace; here would be perhaps a *loggia* for the use of the guard

and a terrace for public enactments. Thirdly, the market-place, an important feature which was rarely missing in any city. This was the *rendezvous* of the citizens, generally overlooked by the town hall and guild-houses, and almost always decorated with a fine fountain, of which such beautiful specimens are to be found in nearly every old continental town. In the North of Europe, except in the case of the parvis in front of the church, the principal place facing the town hall was also the principal market. In Brussels, and also in Vienna, all the old places still preserve by their name the remembrance of their original intention; thus there is the cattle market, the horse, wood, poultry, swine, skin, and vegetable markets.

The custom which we find in most mediæval cities of placing buildings so that they are joined on one or more sides to other buildings tended to produce those groups of open places which give so much charm to old towns.

The grouping of two or three places of unequal size is frequently found in old cities. This has arisen from a variety of causes: it may have been from a desire to separate two places, each designed for a different object—for example, the market-place from the church place, as at Ypres; or it may be that it was advisable to divide them on account of the traffic circulation. Sometimes we find as many as three places thus joined together, in order to give greater effect to the surrounding buildings, which are planned so that each façade has its dominating edifice—for

example, the Piazza and the Piazzetta of St. Mark at Venice (Fig. 139).

All will recollect the admirable effect of the combination of three places at Florence grouped round the Signoria. Similar groups are to be found at Brunswick, Lübeck, and Bremen. This grouping of places is one of the main elements in the æsthetic

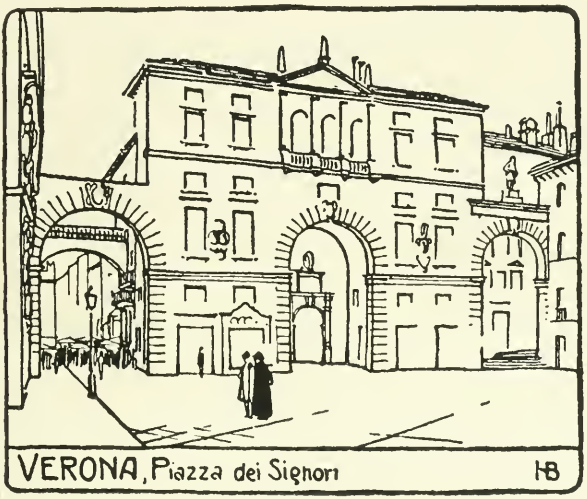


FIG. 117.—PIAZZA DEI SIGNORI, VERONA, SHOWING EFFECT OF ENCLOSING A PLACE

beauty of an old city, and in replanning new quarters in an old city opportunities will arise occasionally where such a treatment might be followed with advantage, and no opportunity thus presented should be neglected.

These mediæval town places owe their harmonious appearance partly to their being surrounded by an unbroken frame of buildings, and partly to the careful

way in which the opening of side streets was contrived by introducing them at the angles instead of the centre of the place. The archway or colonnade is a feature sometimes employed to continue the architectural lines around the place, as at the Piazza dei Signori, Verona (Fig. 117), where wide arches are thrown across two of the streets entering on one side. Where

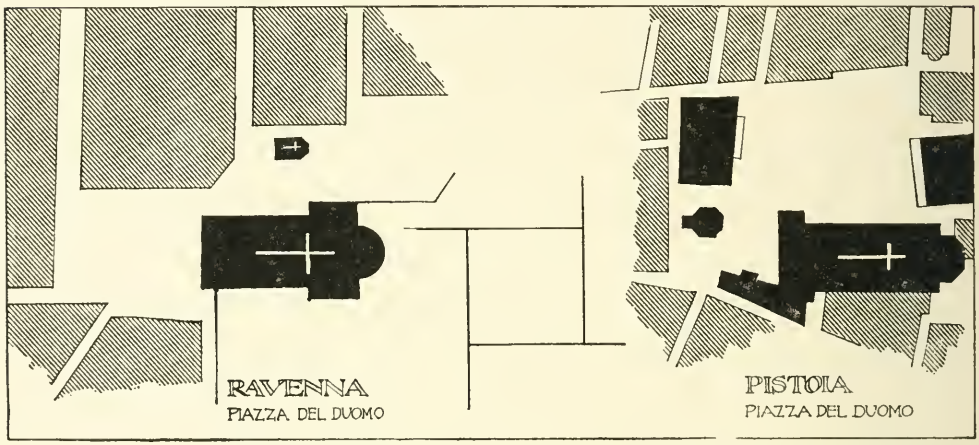


FIG. 118.—PIAZZA DEL DUOMO, RAVENNA, AND PIAZZA DEL DUOMO, PISTOIA, WITH DIAGRAM ILLUSTRATING THE PLAN *EN BRAS DE TURBINE*

it was essential to continue the direction of a street across a place, an effort was made to plan it directly opposite, and where three or four streets entered on one side, each followed a different direction required by the conditions of traffic. We find these instances repeated so frequently that they may almost be considered as the conscious or unconscious principles governing the planning of mediæval cities. A typical instance is that of the Piazza del Duomo, at Ravenna,

which illustrates a remarkable feature of that type of ancient place that Sitte designates *bras de turbine.* The Grande Place at Brussels is another example; it is nearly quadrangular, and the streets enter the square in turbinal form.

"The notion of symmetry," says Sitte, "is propagated nowadays with the rapidity of an epidemic. It is familiar to those least cultivated, and every one thinks himself called upon to contribute his opinion upon such difficult questions as the planning of towns, believing himself to have in his little finger the only necessary criterion, *i.e.*, symmetry. The word is Greek, and yet one could easily prove that in antiquity it had a meaning different from that of to-day. Proportion and symmetry are one and the same thing, the only difference between the terms being that, in architecture, proportion is simply an agreeable relationship to the eye, while symmetry is the same relationship expressed by numbers. This idea existed through the Middle Ages."

Sitte and other writers have often insisted upon the importance of preserving and even creating an irregularity in public places, and although anything like a studied irregularity is hardly likely to be a success, much might be said against the modern folly of always striving after a perfectly regular and symmetrical effect in places, even where they are surrounded by classic buildings. The Roman Forum should teach us this. The irregularities of ancient places (more noticeable on paper than in reality), pro-

ceed from their development and generally from practical causes. The eye is always inclined to overlook the less apparent irregularities, and always fails to estimate angles aright, though it readily appreciates the correctness of regular forms.

It is very difficult to determine exactly the relationship which should exist between the size of a place and that of the buildings which surround it; it is, however, unquestionable that too small a place fails to give value to a monumental building, just as too large a place reduces its apparent dimensions. It is a mistake to think that the idea of size given to a building by a place increases as the proportions of that place are enlarged. Sitte recommends that the smallest dimension of an enclosed place should be equal to the height of the principal edifice erected there, and that its maximum dimension should not exceed twice the height; but rules are of little value to settle the relationship that should exist between the length and breadth of a place, for it must not only look well on paper, but also in reality.

In the modern town plan several types of public places are to be met with. These may be broadly divided into three classes :—

1. Traffic places.
2. Business places { (*a*) Markets. (*b*) Garage places.
3. Ornamental and architectural places.

Traffic places form by far the largest class. We have already dealt with the smaller forms in considering the subject of street crossings (Chapter III.). When such crossings become enlarged, traffic places are created with the object of absorbing the traffic coming from various directions and distributing it into other directions. In England this type of place has never been seriously dealt with, and it has generally been considered sufficient to place a few "islands" at those points where pedestrian traffic seemed to demand them, and the possibilities of treating traffic places as a means of properly intercepting and distributing traffic currents have not been fully realised.

The second class, which we have termed business places, includes those various types of place whose principal object is to facilitate the transaction of business, such as the market-place and the garage place in front of railway stations or similar points.

Ornamental places include all those laid out solely with the object of adding beauty to the surroundings without any regard for considerations of traffic. We do not, of course, mean to imply that a traffic place may not be also a beautiful spot.

Architectural places include those which are designed to set off the surrounding architecture to its best advantage.

It frequently happens that the fulfilment of two or more different purposes is attained by one public place, as in the case of the Place de la Concorde, Paris, which is both a traffic and an ornamental place, and also the

Parisian *ronds-points*, which, besides receiving and distributing the traffic, are adorned with gardens, monuments, and fountains. The Place de l'Étoile (Fig. 119) is a combination of a traffic and an architectural place.

The ideal form of town plan is the one in which the smallest number of traffic places occur, and it certainly does not add to the ease with which traffic circulates if it is continually being obstructed by a large number of streams converging to one point. But as we cannot do away with such places and must perforce regard them as a necessary evil, it only remains to guard against the formation of useless traffic areas resulting from the unnecessary meeting of streets, and in planning such places to take the greatest care first to estimate the volume and direction of the traffic, and then to regulate it by the careful disposition of the islands, whether they be the mere oval-shaped refuge or the more ambitious garden or monumental plot. For practical reasons it is desirable that the various lines of traffic should not intersect one another at one point, and where this is likely to be the case this point should be chosen for a pavement or grass plot. High monuments or any objects likely to impede the drivers' view are to be avoided in such a position.

Spaces devoted to traffic as a rule lack the setting of a proper architectural frame, but they can nevertheless be made to present a more pleasing appearance by so arranging the lines of the street that the eye

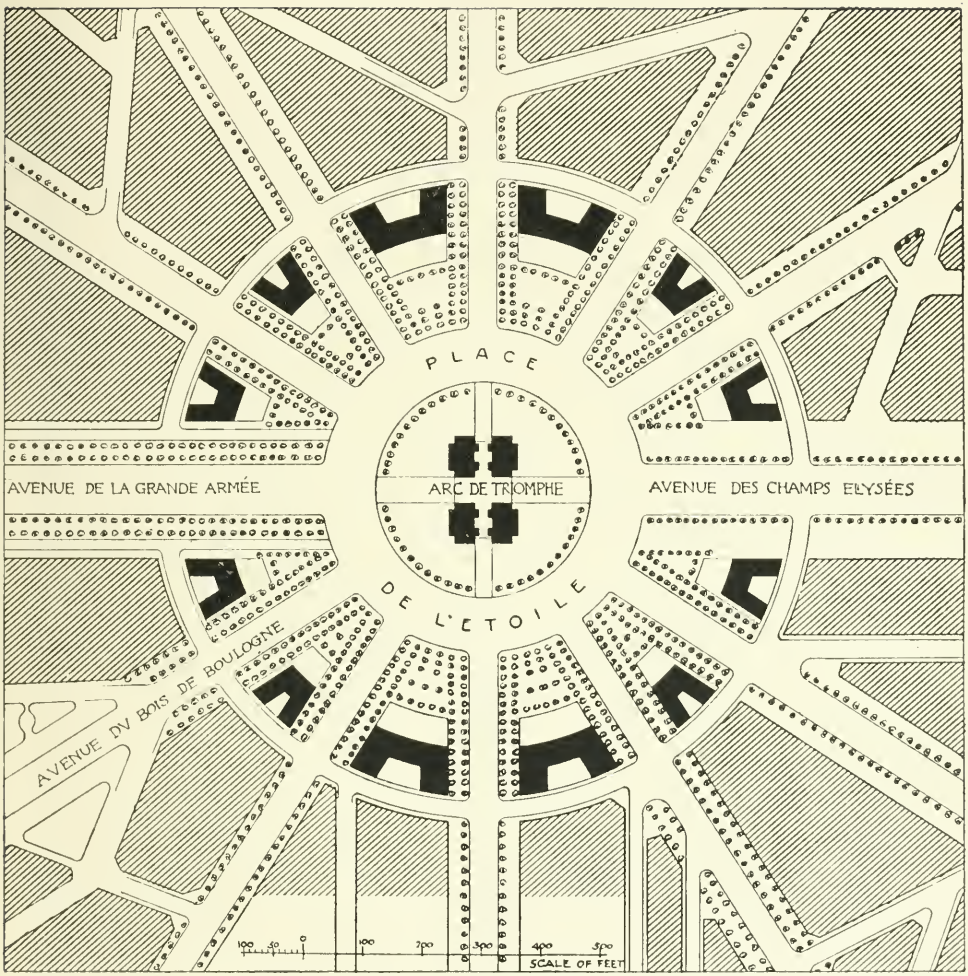


FIG. 119.—PLACE DE L'ÉTOILE, PARIS

travels over the intervening open space and rests on a boundary wall.

A very favourite form of traffic place in modern continental cities is the *rond-point* or circus, upon which the thoroughfares converge like the spokes of a wheel. It has been much used where new quarters have to be united to old ones by thoroughfares. These places have reached their fullest development in Paris in such examples as the Place de l'Étoile and the Place de la Nation (Figs. 119 and 120), planned at the western and eastern extremities of Paris. Both were laid out as part of the scheme for dealing with the traffic of Paris, and also for the necessity under the second Empire of being able to survey properly the streets against riots. The Place de l'Étoile has a total width of 290 yards between the buildings, the central circular roadway having a width of 30 yards. In the midst of the place rises the magnificent Arc de Triomphe erected by Napoleon in 1806; twelve important thoroughfares, varying in width from the 90 feet wide Avenue des Champs Elysées to the Avenue de Jéna only 45 feet wide. In addition to the footpath there is a broad gravelled space planted with trees. The surrounding buildings are all of one uniform style of architecture, which by a special ordinance of the city can never be changed. An interesting feature of the Place de l'Étoile is the outside ring of side streets designed to relieve the traffic and to give additional access to the large blocks of buildings surrounding the place. The Place de la Nation, though not so large, is in some

respects a more serviceable traffic place. It is 273 yards from building to building, the central circular road being about 80 feet in width; ten important, and secondary, thoroughfares converge to the central space, but all tramway lines are restricted to the outer ring next the

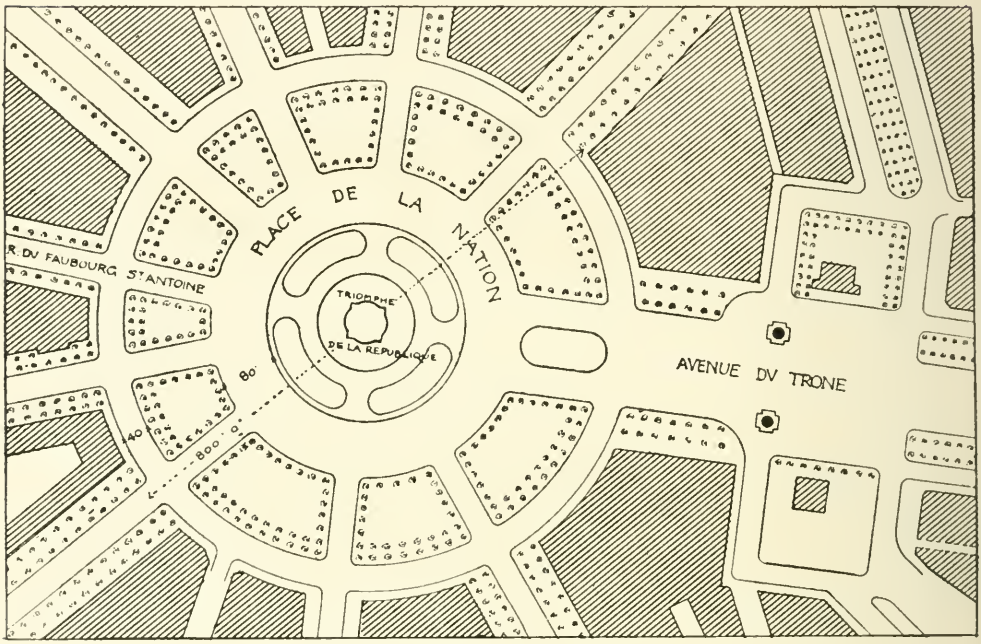


FIG. 120.—PLACE DE LA NATION, PARIS

buildings. The place is plentifully planted with trees, and in the centre stands Dalou's superb bronze group representing the Triumph of the Republic. Where the *rond-point* is of so large diameter as in these two cases it is a convenient form for the traffic place, but where the diameter is smaller, and insufficient to allow for the secondary relieving street, the form can hardly be recom-

mended. The circular enclosing line then becomes inconvenient for buildings, vehicles moving to one point interfere with each other, and pedestrian traffic has either to cross the whole space between the moving vehicles or must take a circuitous route on the footways around the place, unless there be a central island and subsidiary side ones.

It is often impossible to avoid four or five streets

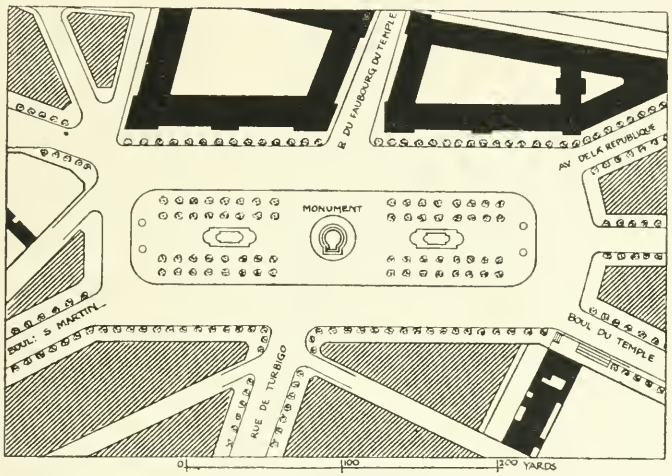


FIG. 121.—PLACE DE LA RÉPUBLIQUE, PARIS

converging. Where this is the case, instead of directing them towards a central point it is better to form an oblong or an elliptical place, both of which forms are preferable for dividing the circulation of traffic. All secondary streets should be treated like the tributaries of a river and made to pour their contents into the lines of the principal current. The Place de la République, Paris (Fig. 121), is a good example of an oblong traffic place;

it measures about 325 yards by 130 between the buildings, with seven main thoroughfares entering, three at one end, two at the other, and one at each of the long sides. The whole of the centre of the place is occupied by a broad promenade with a fine central monument, two fountains, and double rows of trees.

A good example of an oval place is at the Hague, in

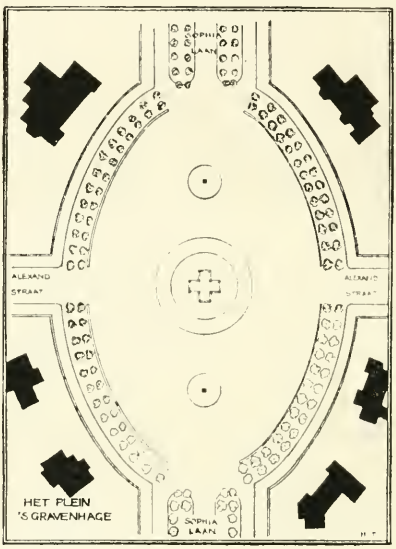


FIG. 122.—HET PLEIN AT THE HAGUE

a space known as the "Plein," planned in 1813, where two important thoroughfares—Sophia Laan and Alexand Straat—meet. A double tramway circulates through the latter street, and the two lines diverge round a central monument; the entire oval is surrounded by a double row of lime-trees and ample space is left for the circulation of traffic. Where it is essential to restrict the area that can be devoted to such a place, the idea shown

in Fig. 123 might well be adopted. The design is made for an oval traffic place entered by eight thoroughfares and occupying an area about two-thirds that of the Place de la Nation; the centre of the place is laid out as a broad promenade with a double row of trees, and

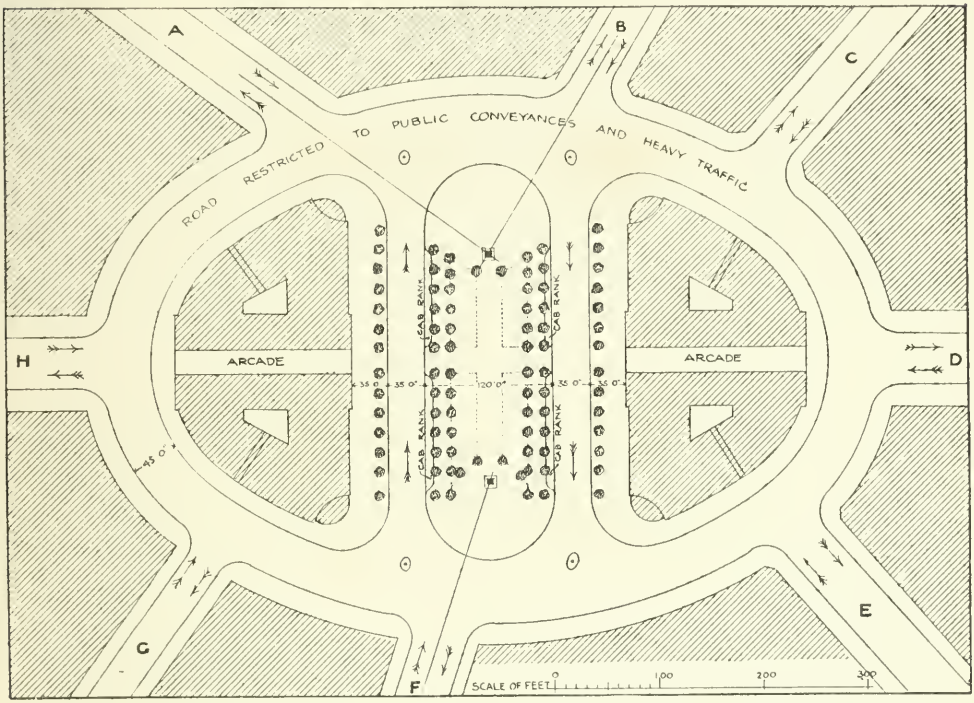


FIG. 123.—DESIGN FOR AN OVAL TRAFFIC PLACE PARTLY OCCUPIED BY BUILDINGS

monuments are placed at either end in such positions that they form vistas for streets A, B, and F. Tramways and omnibus routes would be restricted to the outer ring, and the traffic circulating through the central place would be divided into two streams. Any little inconvenience that this would involve in setting down would be amply

compensated for by the increased speed due to the traffic being kept in one direction. Ample space is provided at those points where cross-currents occur, and islands are placed for pedestrians and to help control the traffic currents. Cab ranks are placed within easy hail underneath the trees of the central island and well out of the way of traffic. The central building blocks would be

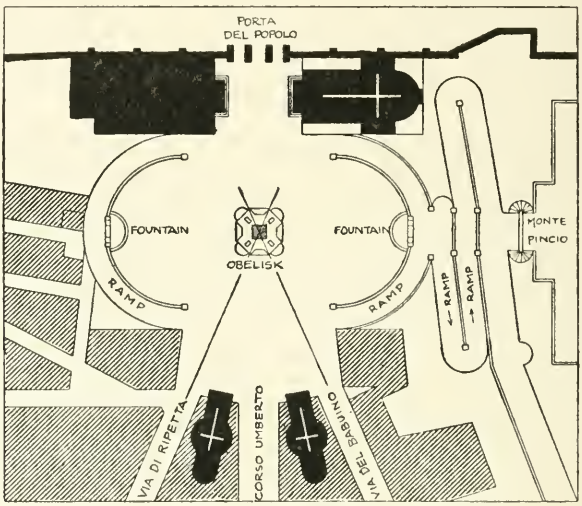


FIG. 124.—PIAZZA DEL POPOLO, ROME

most valuable for shops, and would contribute considerably to the cost of the scheme, the two arcades being particularly well placed for business on one of the principal lines of traffic.

The half-circle is another suitable form for a traffic place, particularly where traffic coming from one direction has to be spread out, as at the principal entrances to towns, railway stations, bridge approaches, &c. The Piazza del Popolo, Rome (Fig. 124), is a good example of

FIG. 125. AM HOF MARKT

FIG. 126. HOHEN MARKT

TWO MARKET PLACES IN VIENNA

this treatment, with an additional charm due to the clever handling of the surrounding architecture. Entering through the Porta del Popolo, we are on the short axis of an elliptical place, the centre being occupied by an obelisk with four running fountains, so placed as to terminate the vista from each of the three streets. Double ramps encircle the place at either end, one leading to the gardens of Monte Pincio; a secondary distributing place adjoins the piazza towards the city and connects the three thoroughfares Via di Ripetta, Corso Umberto, and the Via del Babuino. The two domed churches between the three thoroughfares and the two classic buildings on either side of the town gate give the place a fine monumental character. The approach to the Palace of Versailles (Fig. 166) is an example of a similar treatment, though conceived upon a more grandiose scale. The three broad avenues converge upon an immense central place in front of the palace, from which it is divided by a large forecourt projecting into the place.

The various kinds of places devoted to business or pleasure, in which are included market-places, exchanges, and places for public shows and festivals, form a direct contrast to the places we have just been considering in that all through-traffic, both vehicular and pedestrian, is excluded. In the case of markets the central part is entirely reserved for the exposition of goods for sale. We have many old market-places still left in this country, and very fine some of them are—Norwich, for instance, and the Cambridge market-place with its fountain at the side. In the larger towns of

England and on the Continent open markets have gradually given place to closed ones, but in smaller towns and in suburban areas the demand will still exist and should certainly be encouraged, and town extension schemes should therefore make ample provision for such places, which, besides being a valuable municipal asset, confer great benefits upon all classes. They should

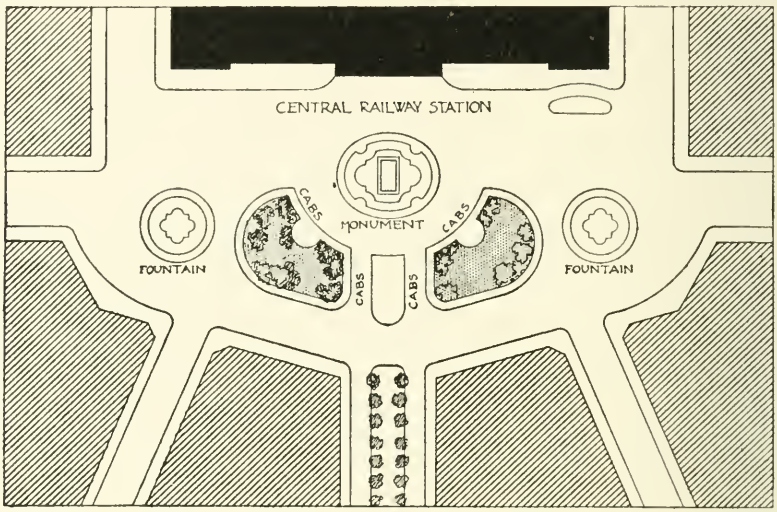


FIG. 129.—PLAN OF THE BAHNHOFPLATZ, HANOVER

be planned as near as possible to centres of road and railway or canal traffic, in close proximity to at least one important thoroughfare, and carriages or tramways must in no way cross the place. Plenty of trees should be planted round the sides and in the centre, and every effort made to render the place attractive as a promenade, as well as a useful centre for shopping. It might also be possible to lay out such a place so that, in addition

FIG. 127. RATHAUSPLATZ, VIENNA

FIG. 128. BAHNHOFPLATZ, HANOVER

to being a market by day, it might be used for entertainment purposes in the evening, after the manner of some of the small Spanish *alamedas*. The long stretch of the Piazza Navona in Rome, adorned with three magnificent fountains, used as a market by day, is illuminated and rendered charmingly attractive as a public dancing place by night.

The type of business place which on the Continent is known as the garage place, generally planned in front of railway stations, is almost unknown in this country. We include amongst garage places those planned in front of railway stations for the accommodation of cabs, automobiles, omnibuses and trams. Here the circulation must be carefully divided by islands in well chosen positions, and ample provision should be made for all kinds of standing traffic. Towards the town an admirable site might be provided for a monumental arch or some architectural composition to mark the entrance, *e.g.*, the Porta Umberto at Milan.

The railway termini have taken the place of the old city gates, which, as we may see from the many examples still left to us, were prominent architectural features. Is it not possible then for us to do as much for our railway stations, and to ensure that the places upon which they abut shall form artistic and dignified entrances to our cities? In America the Railway Corporations are realising that it pays to make station surroundings attractive, and many of the large European cities, like Hanover, Turin, Basle, and

Milan, have laid out their garage places in a strikingly beautiful way, in order that the first impression of strangers arriving by rail may be a favourable one. At Genoa, besides the erection of a fine monument to Columbus, the authorities have very successfully planted the garage square with palms, flowers, and shrubs. The Bahnhofplatz at Hanover (Figs. 128 and

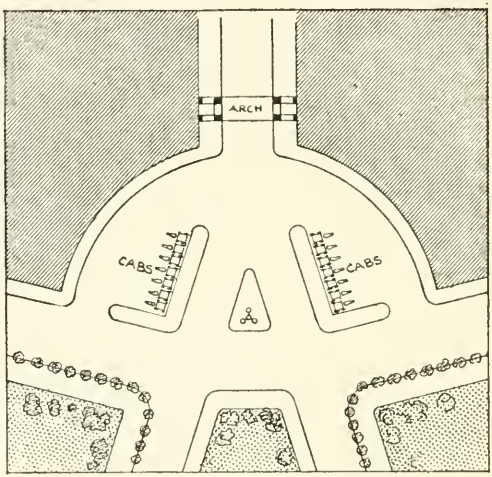


FIG. 132.—KARLSPLATZ, MUNICH

129) is a model of its kind; the place is semicircular in form and for the better circulation of traffic the central part is laid out as a garden. Three large thoroughfares converge to the outer part of the place and take the traffic to either side of the station, the central roadway being reserved for cab stands and smaller vehicular traffic. As in most cities on the Continent, the railway place is the principal starting place for the entire tramway system of the town.

Another form of garage place which is badly required in all our cities is a properly equipped place for the hiring of vehicles. In planning city extensions and improvements all provision for this kind of place is invariably omitted, and for want of better arrangement, vehicles for public hire are placed in the centre of roadways or allowed to block up the sides. A good plan is that shown in Figs. 131 and 132 of the Karlsplatz at Munich, where the cabs are arranged in a kind of recess easily accessible from the footway. Fig. 131 also shows some very well designed shelters for passengers waiting for the trams.

Ornamental and architectural places include:—

(*a*) Those partly surrounded by buildings, but in which the architectural element is not paramount.

(*b*) Those entirely surrounded and enclosed by buildings of a homogeneous and monumental character.

(*c*) Places laid out primarily for purposes of ornamentation either as gardens or for the erection of statues or memorials.

(*d*) Places planned as forecourts to public buildings.

(*e*) Places which are partly built upon.

(*a*) Places Partly Surrounded by Buildings

The Königsplatz, Berlin (Fig. 133), the largest example of an ornamental place in Europe, belongs to this class. It is bounded on either side by the Parlia-

ment House and the new Royal Opera. A superb approach road, the Sieges Allee or Avenue of Victory, forms the axial line from the south. The central part of the place is occupied by the Sieges Saule, and on either side are colossal monuments to Bismarck and Moltke (Fig. 134); both monuments gain considerably from their fine architectural backgrounds, the Parliament building and the new Royal Opera House. A smaller garden place is added at the north end, with a central avenue terminating in a statue to Count Roon and sunken gardens on either side. The planting on the north and south has been admirably arranged both to set off the monumental buildings and as a framework to the place, and although of such vast dimensions the colossal proportion of both buildings and monuments has succeeded in preserving the general scale.

Next in size to the Königsplatz amongst European examples is the Rathausplatz off the Franzensring in Vienna, but this place is more of the nature of a small park. In the centre an axial line is obtained by the Allee leading from the Hofburg Theatre to the Rathaus, lined with memorials to various benefactors of the city. To right and left of the Rathaus are the University and the Parliament building.

The Place de la Concorde, Paris (Figs. 136 and 138), answers the dual purpose of an ornamental and traffic place. It is planned at the crossing of two important axial lines, north and south from the Madeleine to the Chambre des Députés, and east and west from the

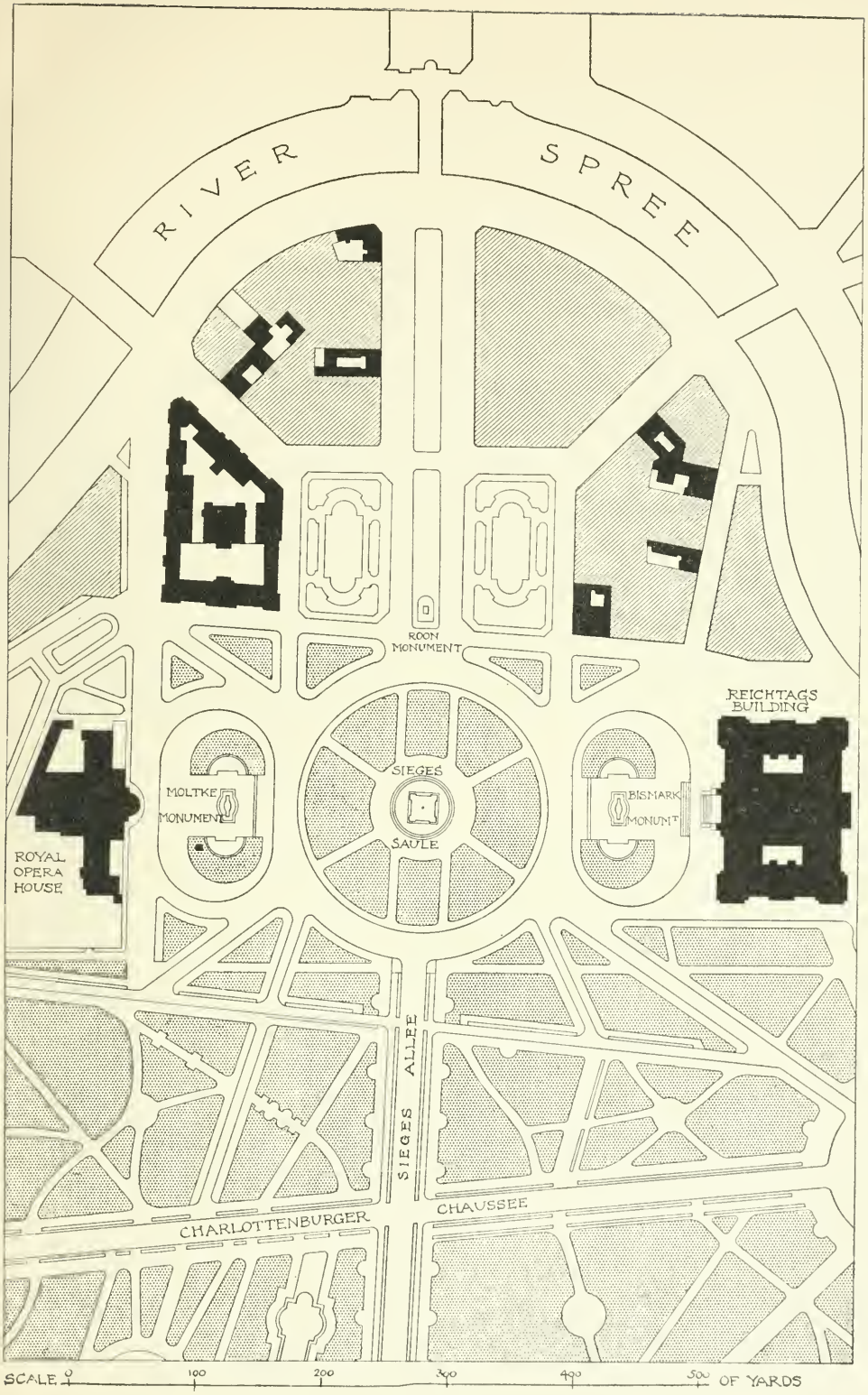


FIG. 133.—KÖNIGSPLATZ, BERLIN

FIG. 134. THE BISMARCK MONUMENT, KÖNIGSPLATZ, BERLIN

FIG. 135. THE SIEGES ALLEE LEADING TO THE KÖNIGSPLATZ, BERLIN

FIG. 136. PLACE DE LA CONCORDE, PARIS

FIG. 137. PLACE VENDÔME, PARIS

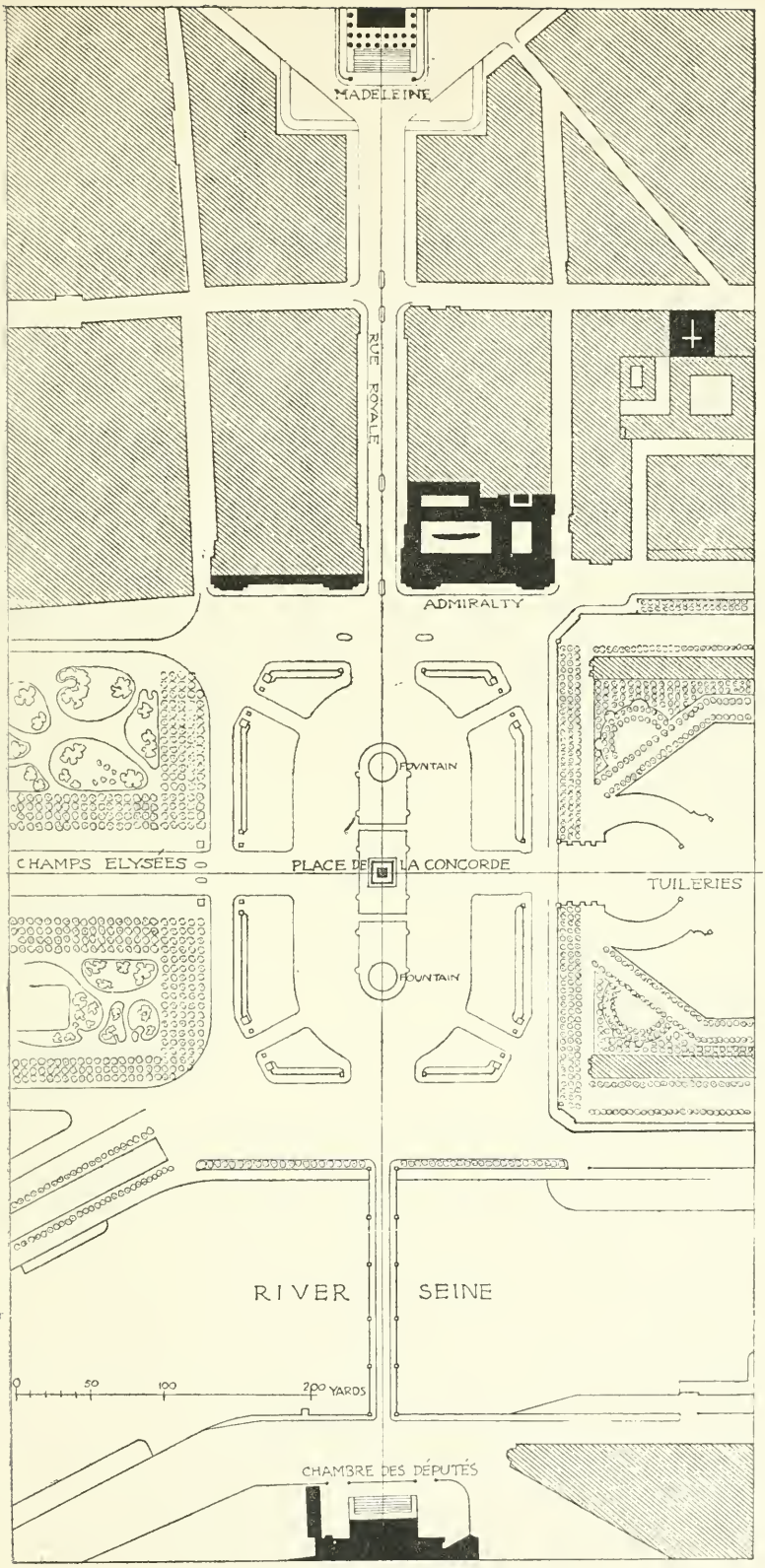


FIG. 138.—PLACE DE LA CONCORDE, PARIS

Tuileries to the Arc de Triomphe. Though smaller in area than the largest Berlin and Vienna places, the monumental effect is quite unrivalled in Europe. In the middle of the eighteenth century the place was still a waste piece of ground. After the peace of Aix-la-Chapelle Louis XV. allowed the municipality of Paris to erect an equestrian statue to him. The place has passed through many phases since this time: the statue was destroyed during the Revolution, and in 1836 the obelisk of Luxor and the two monumental fountains were erected in the centre. The traffic requirement forced Haussmann, to his great regret, to fill up the sunken parterres. The place is bordered by a monumental balustrade with two large stone figures at each of the four angles, representing the chief towns of France, and twenty bronze rostral columns complete the decoration. The densely planted trees on the sides of the Tuileries and Champs Élysées take the place of an enclosing frame. All gardens have been avoided, as the place is looked upon as a public meeting place, like Trafalgar Square.

(*b*) Places Entirely Surrounded by Buildings

Public squares that are entirely surrounded and enclosed by buildings are likened by Stübben to the *salons* of a town, just as the streets may be compared with the passages, the traffic places with the lobbies and halls, and the garden squares with the living rooms, of a house. Such squares do not require a long street vista to set them off properly; it is better

that they should rely for their effect entirely upon their own architecture, a suitable grouping of the buildings, and a due sense of proportion between the height of the buildings and width of the place. The surrounding architecture, whether regular or irregular, should be regarded as the frame to a picture, and the street

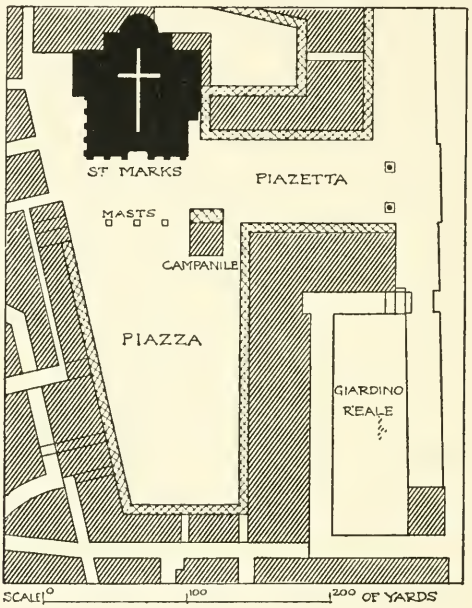


FIG. 139.—PIAZZA DI SAN MARCO, VENICE

openings breaking into it should be as few as possible, and where it is impossible to avoid a number of openings, some of these might well be bridged over, as at Verona (Fig. 117). A regularity of form is by no means essential, and, indeed, is often very difficult to discern ; *e.g.*, in St. Mark's Place at Venice (Fig. 139) we see how deceptive such a plan may be when put on

paper, for to the majority of observers it would be impossible to say that the length of the two shorter ends was not identical. At the same time an irregularity should not be purposely created ; it must originate from the historical topography of the town or be founded on local conditions, in which case it will frequently be beautiful, harmonious, and picturesque. In a formally laid out plan, the architecture should be formal and grouped, though of course not necessarily of one identical pattern. A geometrically laid out place, enclosed within parallel lines, is an artificial and formal creation, and to give it its full effect requires artificial and formal buildings. Where such a place is not designed on formal lines, and, as in the case of most of the old market-places on the Continent, an irregular and picturesque character dominates the site, the surrounding buildings should themselves partake of that character. But every enclosed place should belong definitely to one type or the other, and any attempt to blend the two can only end in failure. A slight variation in the ground level of such a place is of no great moment, but when there is a decided fall in the ground, the problem is not easily solved, and it may be better to abandon the idea of an entirely closed place altogether, and to divide the space into two parts on two separate levels. The artificial raising of the centre of the place that we so frequently find is quite unnecessary and is not to be recommended.

The oblong form is that most generally used for an architectural place, and the most usual propor-

tion between the long and short sides is one to three; when the place is unduly long it practically becomes a street. The square form is also pleasing, especially if the streets enter at the four corners. The triangular form is not often used for an architectural place. Circular places are generally too regular and geometrical to be pleasing, and the oval form is better both from the point of view of circulation of traffic and also as being more adapted to the display of monuments. Two semicircles combined with straight sides give a fine decorative effect.

Another important consideration is the harmonious proportion between the dimensions of the place and the height of the surrounding buildings. If the place is too large for these buildings they lose much in importance; if too small it is impossible for the spectator easily to judge their architectural effect. Herr Maertens[1] makes the following useful suggestions regarding the sizes of places. When placed at a distance equal to the height of the building the spectator is able to distinguish its detail within an angle of 45°, the visual angle being 45°. When placed at a distance equal to twice the height of the building the spectator's view embraces the entire building, which he sees within an angle of 27°; when placed at a distance equal to three times the height the spectator is unable to distinguish the detail, but sees the contour of the building in its relation to neighbouring buildings within a visual angle of 18°; when

[1] "Der optische Maastab," Berlin, 1884.

Fig. 140. PIAZZA DEL' PLEBISCITO, NAPLES, A SEMICIRCULAR ARCHITECTURAL PLACE

Fig. 141. PIAZZA DEL' MUNICIPIO, NAPLES

placed at a distance equal to four or five times the height of the building the spectator only distinguishes a picturesque silhouette.

The Place Vendôme, Paris, and Amalieborg Platz, Copenhagen (Figs. 137, 142, 143), and Belgrave Square, London, illustrate the effect of placing the four corner

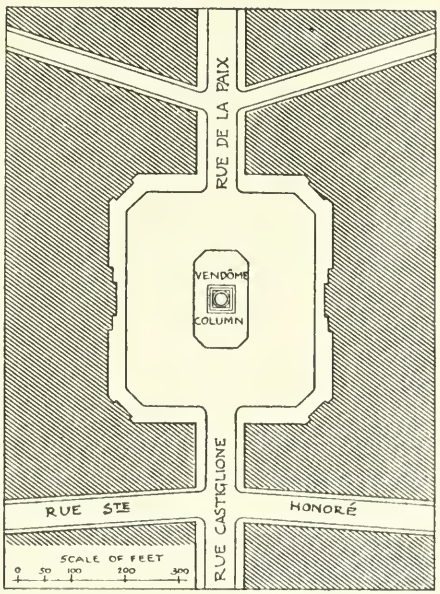


FIG. 142.—PLACE VENDÔME, PARIS

buildings at an angle of 45°. In the Place Vendôme the centres of the long sides are emphasised by slight projections which serve to break up the monotony of the skyline. The centre of the place is occupied by the magnificent Colonne Vendôme, an imitation of Trajan's Column at Rome. A fault in the planning of this square is the danger to pedestrians of having to cross

a wide area of roadway, unless they care to walk all round the footways. This arrangement is inevitable where the centre of such a square is occupied, as in this case, by a monument. The same remark applies to the Amalieborg Platz, where, however, the inconvenience is not so severe, on account of the smaller amount of traffic. In both these examples the size of the place has not been exaggerated and the relative

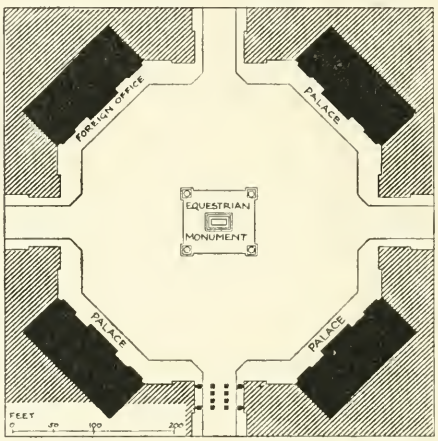


FIG. 143.—AMALIEBORG PLATZ, COPENHAGEN

proportion between the height of the buildings and the area of the square is pleasing. The result of scattering the buildings is shown in the case of the Königsplatz, Munich (Fig. 173), where the width of the place is very much exaggerated and the three monumental buildings would appear to better advantage if the width had been lessened about two-thirds its present dimension, and if at the same time a better frame had been provided and the awkward-looking angles had been

FIG. 144. LUSTPLATZ, BERLIN

FIG. 145. HOFBURG PLATZ, VIENNA

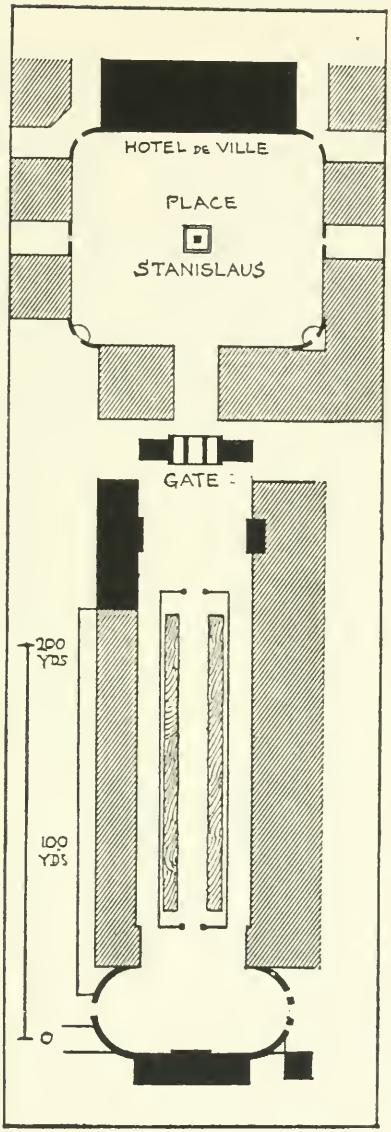


FIG. 146.—PLACE STANISLAUS, NANCY

filled in with architecture, or even treated like the Place Stanislaus (Fig. 146). In the Lustplatz, Berlin (Fig. 144) where the surrounding buildings were scattered, the necessary framing has been imparted by a double row of high trees, and the vehicular traffic has been diverted to either side, leaving the whole of the centre part for gardens and promenade.

The Stanislaus Place at Nancy (Fig. 146) is a particularly beautiful example of an architectural place. The laying out of the city was inaugurated under the rule of Stanislaus Leczinsky, whose architect, Emanuel Héré, showed in the treatment of the Place Stanislaus an ability not inferior to any of the great French architects of the eighteenth century. He cleared the waste space between the old and new town and planned the place as the central point of the united city. The work appears to have created considerable interest at the time, and Héré has left a large volume of engravings illustrating the design. The whole of the principal side is occupied by the beautiful façade of the Hôtel de Ville; the east and west sides are bordered by palatial buildings of equal height, and on the fourth side the buildings are lower, consisting of small *cafés* kept down to a ground storey in order to provide a foreground for a fine triumphal arch which marks the entrance to the Place de la Carrière, some 300 yards long. Instead of the four angles of the square being closed, the buildings have been stopped short and gilt iron grilles and gateways are arranged in conjunction with fountains.

The Maria Theresien Platz, Vienna (Figs. 147, 148 and 149), is largely laid out as a monumental garden place, particularly suited to its purpose of rendering the two Museums on either side free from dust and

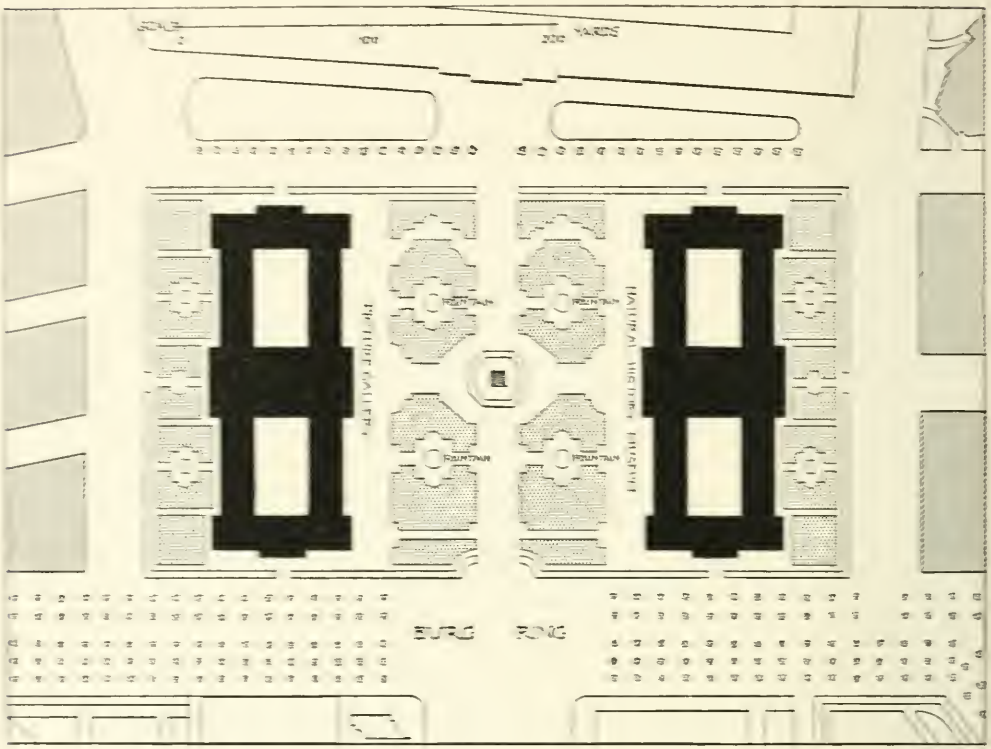


FIG. 147.—MARIA THERESIEN PLATZ, VIENNA

noise. In the centre is the monument to Maria Theresa, with well laid out parterres and fountains. Gottfried Semper prepared a scheme for continuing the place and including the Hofburg buildings, which if ever carried out would make

FIG. 148. MARIA THERESIENPLATZ, VIENNA

FIG. 149. MARIA THERESIENPLATZ, VIENNA. ONE OF THE FOUR FOUNTAIN GROUPS

this the largest and finest architectural place in the world.

The idea of an architectural square of uniform buildings probably originated in Paris, where the Place Royale (Fig. 150) was laid out by Henri IV. in the early years of the seventeenth century. It is an exact square of 152 yards, and the surrounding architecture and arcades still retain much of their original character. The Place des Victoires, Paris (Fig. 151), laid out from Mansart's designs in 1685, was another regularly laid out place; at intervals of every 10 feet or so Ionic pilasters supported the cornice, and the vertical lines effectively broke up the curved surface; the angles of the streets entering the circus had strongly marked rustications. Unfortunately it has not preserved its architecture intact to the present day, and has been completely spoiled in consequence. The district appears to have fallen upon evil times, with the result that the owners of the houses have made no attempt to adhere to the original design. This is, of course, the great danger in architectural squares belonging to many different owners, unless, as in the case of some of the more important Parisian examples, an ordinance forbids owners to deviate from one design.

From France the idea of the Place Royale was soon imitated in London, where, about 1620, a Commission was appointed by the Crown to "plant and reduce to uniformity Lincoln's Inn Fields as it shall be drawn by way of map or ground plot by Inigo Jones." Like the Place Royale, the square was surrounded by private

houses, forming one continuous façade, broken only in the centre and at the angles by buildings rising slightly above the rest. The centre of the square was laid out as a garden and the streets were contrived to enter at the four corners. A few years later the idea was imitated in a grander form in the piazza of Covent Garden, where an arcade was carried along the whole of the north and east side; the church completed the west side, and the south was enclosed by trees. The idea, once started, soon grew into favour, and towards the end of the eighteenth century an increasing demand for dwelling-houses of a more stately character resulted in many large London estates being dealt with as a whole. The usual plan was to form a large open square, to plant trees and shrubs therein, and to design the houses with a view to their architectural symmetry. There is something very attractive about these great London squares which makes them still favourite residential quarters.

The Circus and Crescent at Bath (Figs. 152 and 153), designed by John Wood the elder about the middle of the eighteenth century, are both interesting examples of architectural places. The intention of the architect appears to have been to impress the spectator from a near point of view as a distant view was impossible. The diameter of the Circus from house to house is about 320 feet and the major axis of the Crescent (an ellipse on plan) 550 feet. The imposing effect of the Crescent gains considerably from its situation. It appears to the spectator almost suddenly, with a broad sweep of lawn stretching in front of it from end to end.

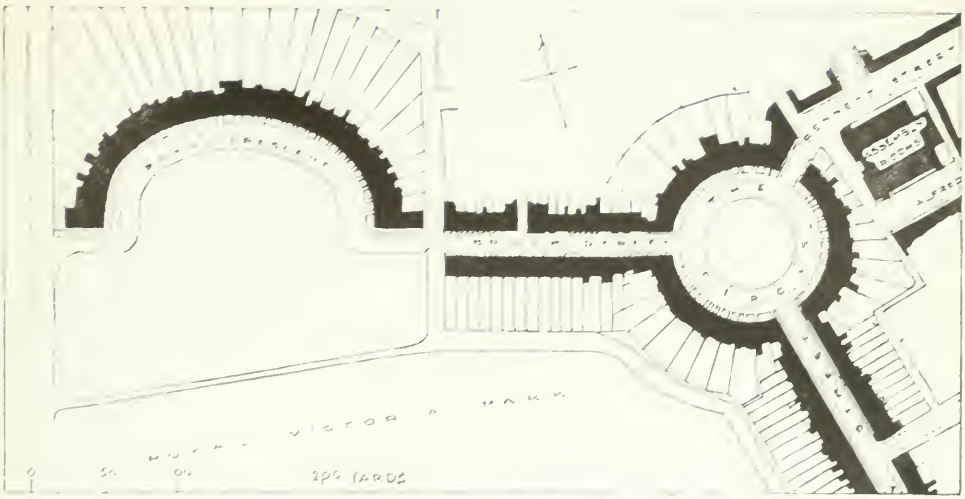


FIG. 152. THE ROYAL CRESCENT AND CIRCUS, BATH

FIG. 153. THE ROYAL CRESCENT, BATH

(*c*) Places Laid Out for Purposes of Ornamentation

A good example of an ornamental place is the Place Malesherbes, Paris, formed by the junction of the Boulevard Malesherbes and the Avenue de Villiers, two thoroughfares each about a hundred feet

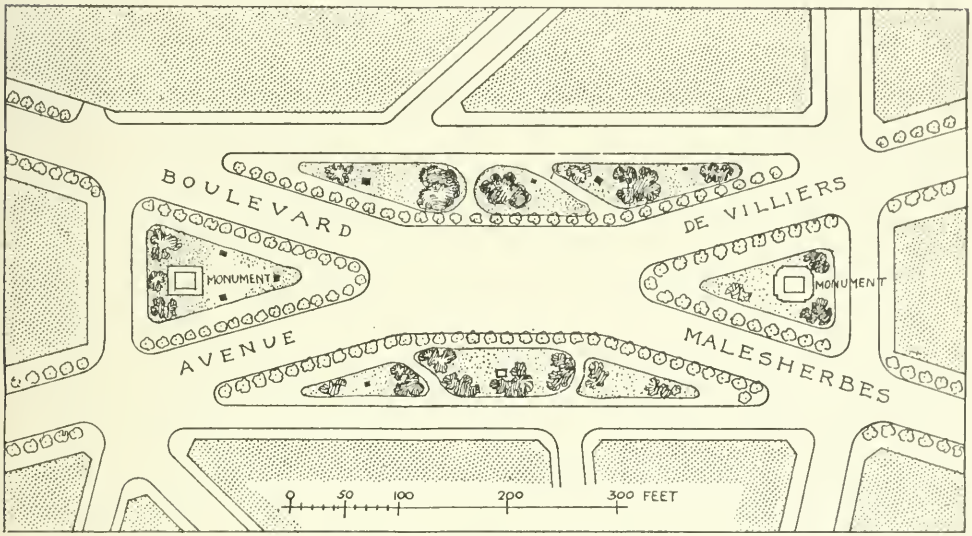


FIG. 154.—PLACE MALESHERBES, PARIS

broad, with double tramway lines. Gardens have been arranged in the four triangular spaces adorned with fine bronze figures representing the Genius of Music by Bailly and the Grief of Orpheus by Verlet, and at either end of the place are superb symbolical groups, monuments to Dumas père, designed by Gustave Doré, and to Dumas fils, by Saint Marceaux, and also to General Dumas. It has been

proposed to rename the place "Place des Trois Dumas," a worthy manner of honouring the trio of great Frenchmen. The Luisen Platz at Charlottenburg (Fig. 156) is another fine example of an ornamental place; it is planned to set off the royal palace to better advantage, the principal feature being the equestrian monument to the Emperor Frederick III. erected by the town of Charlottenburg in 1905.

To make any attempt at landscape gardening in a town square, bounded on all sides by solid blocks of buildings, is hardly likely to be a success. The treatment of such a square should be in an architectural and formal manner. It is, in fact, an evolution from the sidewalk. Any embellishment that it may receive should be monumental in character, such as stone terraces and steps, monuments and statues arranged in harmony with the environing buildings, and disposed in such a way that they will not conflict with the usefulness of the place. If the space is sufficient, a rectangular alignment of shade trees could be introduced, with just sufficient amount of turf at their base to protect the roots from too hard a ground surface and also to soften the harshness arising from an expanse of stone or asphalt paving. But the introduction of turf or trees should be completely subordinated to the architectural character of the place, and should be so carefully arranged that the walking space should remain practically undisturbed.

When we remember how country-loving a person

FIG. 155. THE DUMAS MONUMENT PLACE, MALESHERBES, PARIS

FIG. 156. LUISENPLATZ, CHARLOTTENBURG

the average Englishman is, and that English private gardens are undoubtedly the finest in the world, it is certainly surprising that so little is done towards making our public places more attractive by the planting of trees, shrubs, and flowers. For nothing does more to increase the charm of cities than the bringing into them of as much of the country as is compatible with the artificiality of a town. In London squares as they now exist, nothing is more noticeable than the want of colour. We see them invariably surrounded by a dense and forbidding mass of lilac, and the principal object of their existence is to shut out all view of their lawns from the gaze of the passer-by. Even in those squares that have been handed over to the public care, the tradition of reserve is still kept up, and of colour and flowers there are none. Of course, brilliant flowers will not flourish under spreading trees, but there are plenty of openings and spaces which a skilful gardener could utilise. A much greater use might be made of tubs of flowers or baskets suspended from street standards, which can be so easily removed from time to time. The effect of such in Paris gives considerable charm to its streets during the summer months.

An idea well worth considering is shown in Fig. 157, illustrating the treillage screen surrounding the Beethoven Platz, Vienna. In this case treillage has been used with remarkable effect to enclose the place until the limes have had sufficient time to grow up; the treillage will then be removed, and the trees will

form a kind of green cloister round the place. Fig. 158 shows a garden planned in the heart of Berlin, always gay with flowers and verdure, and which does not appear to suffer from being in a very dusty position. The garden of the Palais Royal, Paris (Fig. 159), originally laid out by Le Nôtre, is a good example of a more secluded garden, and might well be imitated in the London squares. The Jardin de la Fontaine, Nîmes (Fig. 160), is an admirable example of the treatment of water in a city garden, the lines of its design being kept purely architectural. The Belle Alliance Platz, Berlin (Figs. 161 and 162), is a garden planned upon an important traffic route; the central walk is kept the full width of the thoroughfares, and vehicular traffic is relegated to the sides of the place.

(*d*) Places Planned as Forecourts to Public Buildings

Forecourt places are particularly valuable as a means of exhibiting the architecture of an important public building to its best advantage. It is inadvisable that important buildings should be erected in a line with the frontages of the other buildings in the street, and if it is possible to set them back somewhat, an air of greater importance is imparted, and, at the same time, they gain considerably by being seen in a more favourable perspective. In France, the forecourt (*cour d'honneur*) is a very favourite device, and few important public buildings

FIG. 157. TREILLAGE SURROUNDING BEETHOVENPLATZ, VIENNA

FIG. 158. PARISERPLATZ, BERLIN

Fig. 159. PALAIS ROYAL, PARIS

Fig. 160. JARDIN DE LA FONTAINE, NÎMES

are planned without it. For such buildings as churches, museums, or art galleries, a forecourt ensures greater quietude and freedom from dust.

Fig. 163 shows three alternative suggestions for treating such a forecourt place, viz., with wings planned in the form of a quadrant; set back square with the street; or by planning part of the place on the opposite side of the road. This last arrange-

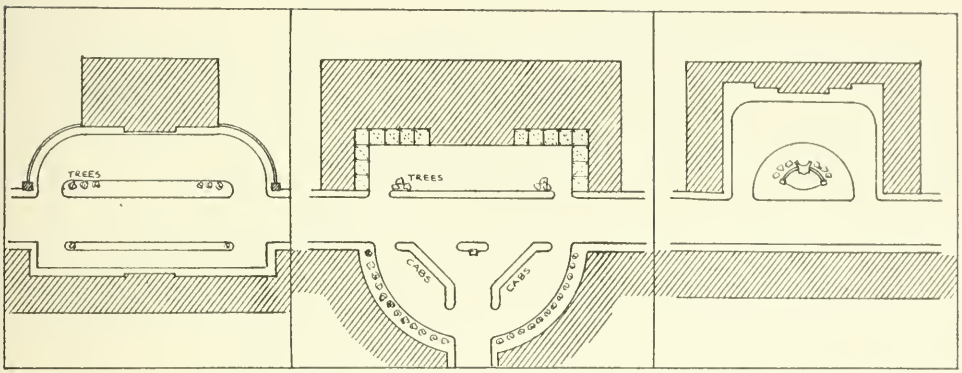


FIG. 163.—ALTERNATIVE SUGGESTIONS FOR THE TREATMENT OF A FORECOURT PLACE

ment has much to commend it, especially where there may be a road entering the place. Generally speaking, the depth of such a forecourt should be equal to one and a half to twice the height of the building, in order that its façade may be properly seen. The finest and most monumental place of this kind in the world is that which Bernini planned in front of St. Peter's (Fig. 164). The place consists of three parts—the Piazza Rusticucci, surrounded by hotels and shops; the large oval piazza, 370 yards by 260;

and beyond that a forecourt with steps leading to the principal entrance. The great piazza is enclosed with an open double colonnade and the forecourt with a closed *loggia* of grandiose proportion. The ground level of the oval place falls slightly to the centre, but beyond, it rises towards the entrance to the cathedral.

It was originally the intention of Sir Christopher Wren to surround St. Paul's Cathedral by a colonnade similar to Bernini's treatment of St. Peter's, and the design which he made for this scheme is preserved in the Soane Museum, London. The junction with Fleet Street was well imagined, and had the funds been forthcoming at the time, the appearance of St. Paul's Cathedral would have been immensely improved and its precincts rendered more secluded. At Naples, the Piazza del Plebiscito (Fig. 140) is an example of the enclosed colonnade treatment on a large scale, but it suffers somewhat from the insignificance of the central architectural feature, the Church of San Francesco di Paolo.

Another example of a forecourt place, though planned on a more humble scale, is the Place de la Trinité, Paris (Fig. 165). As in the case of the larger example, it shows the good result of raising the monumental building well above the surrounding ground level. In this case a double ramp encloses a small oval garden and ascends to the *porte cochère* of the church. The Église de la Trinité is built upon one of the sides of the place; the three other sides

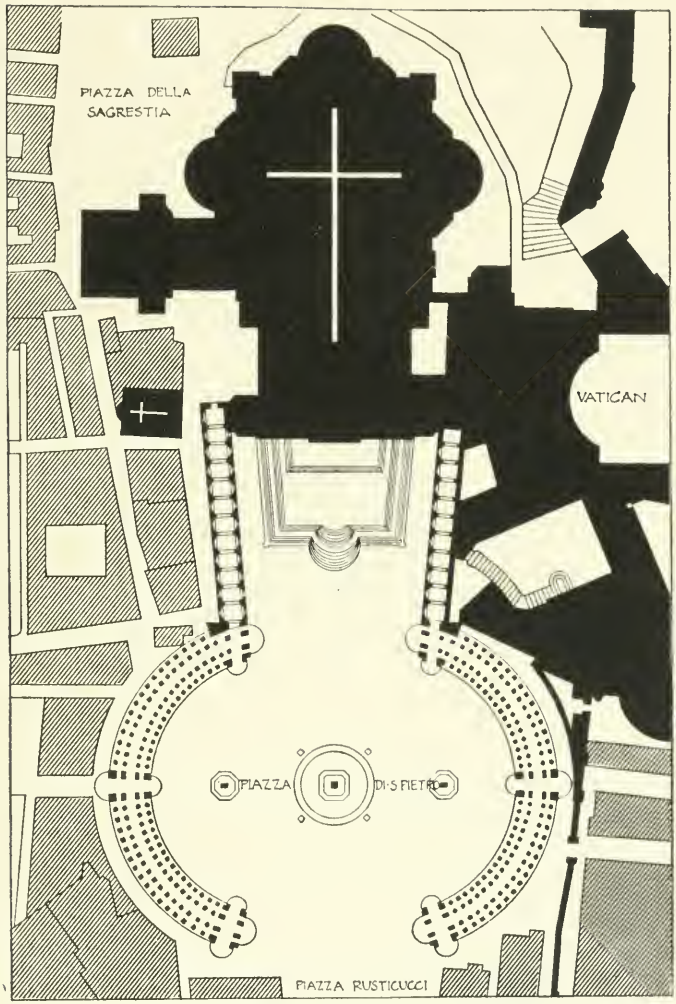


FIG. 164.—PIAZZA DI S. PIETRO, ROME

are too much cut up by streets entering the place at various angles.

The immense courtyards in front of the palaces of Versailles and Caserta are examples of approaches planned upon a vast scale. The former consists of

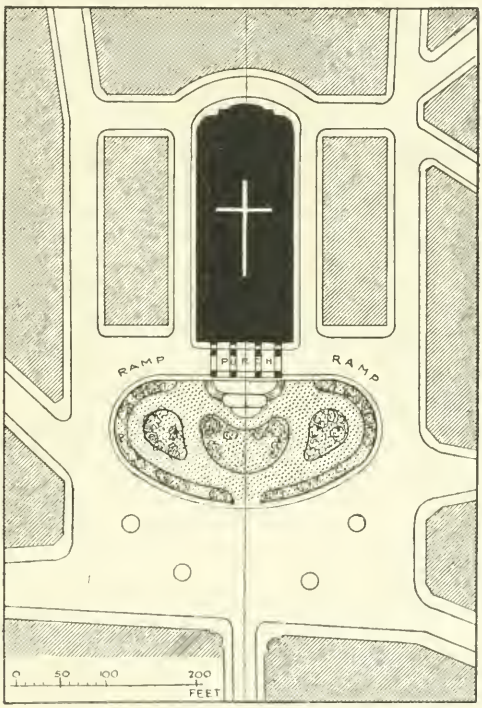


FIG. 165.—PLACE DE LA TRINITÉ, PARIS

three separate courts—the inner courtyard, or *Cour de Marbre*, enclosed by the wings of the palace; the outer courtyard, or *Cour Royale;* and the third fan-shape courtyard, or *Place d'Armes*, for great public reviews and displays. The effect of the approach is marred by the lowness of the palace buildings and the lack of an

imposing central feature (compare Charlottenburg Palace, where a well proportioned dome dominates the courtyard), and also because the Place d'Armes rises considerably and obscures the base of the buildings. At the palace of Caserta, near Naples, five broad road-

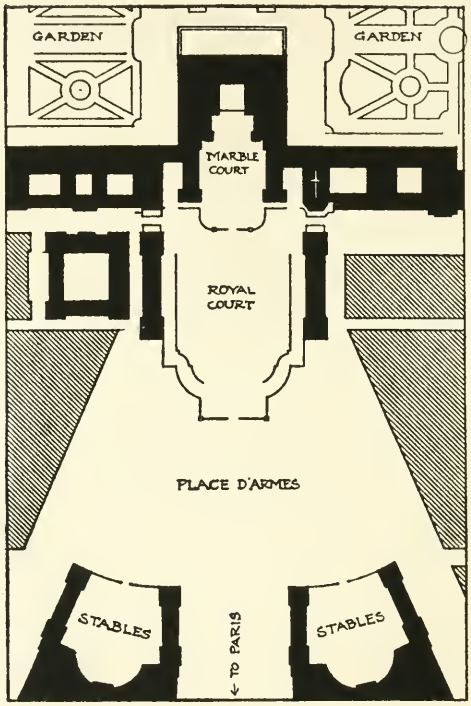


FIG. 166.—FORECOURT TO THE PALACE OF VERSAILLES

ways diverge upon an immense oval court, the two axes of which are 360 and 230 yards respectively; it is thus probably the largest oval courtyard in existence. The palace is set back, surrounding a second oblong court. A very favourite device in eighteenth-century palaces was to spread the approach place out

in the form of an immense fan and surround it with dependencies, as at Nymphenburg, near Munich. A far more architectural and dignified form is that of the Schlossplatz at Coblenz (Fig. 168), where the palace buildings surround three sides of an inner garden

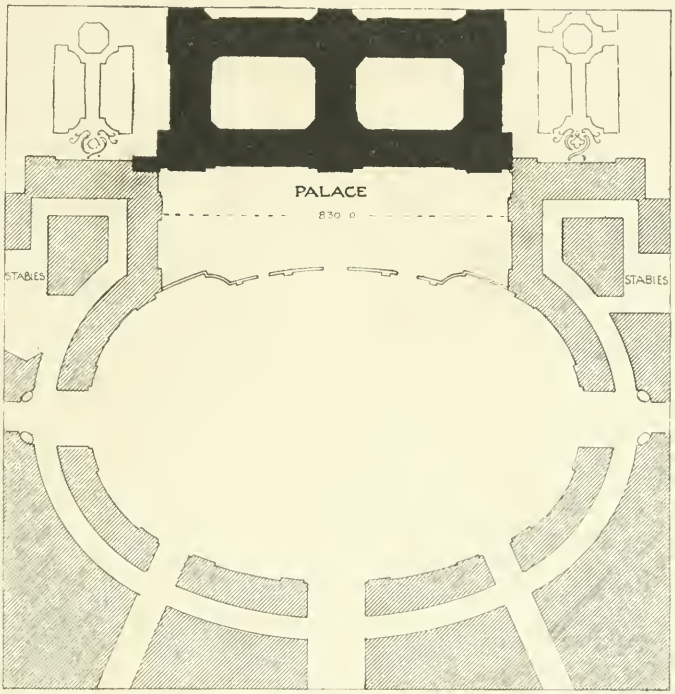


FIG. 167.—FORECOURT TO THE PALACE OF CASERTA, NEAR NAPLES

courtyard, the central axial line amounting to over 300 yards. Many of the French eighteenth-century *châteaux*, planned like the Trianon upon a smaller scale, have delightful forecourts that might well be imitated in modern town planning schemes.

(*e*) Places which are Partly Built Upon

In the last group are gathered those places which are partly built upon. These frequently occur in cities where triangular and irregular sites have been created by intersecting thoroughfares, and are suitable for the

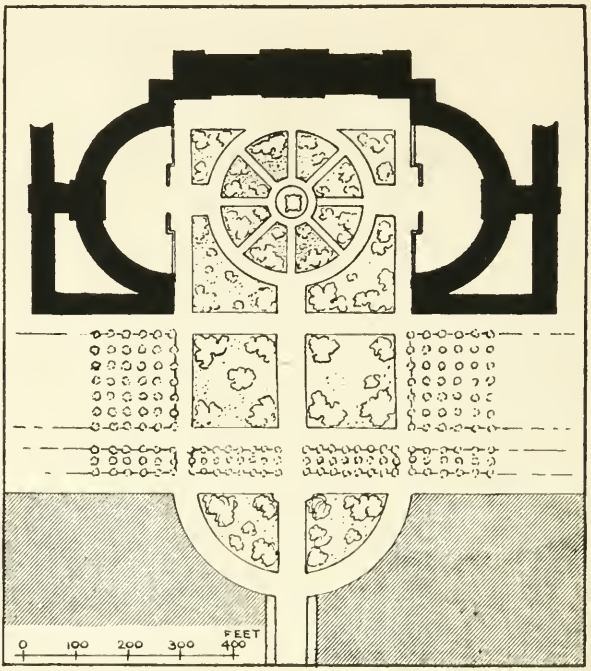


FIG. 168.—SCHLOSSPLATZ, COBLENZ

erection of such buildings as churches, museums, and picture galleries, whose character demands an important open site on account of their architectural importance and of the necessity of obtaining light on all sides. Extremes of narrowness and width are to be avoided; an exaggerated width leads to a feeling of emptiness which it is not easy to disguise by tree planting and

Fig. 169. PLACE ST. AUGUSTIN, PARIS

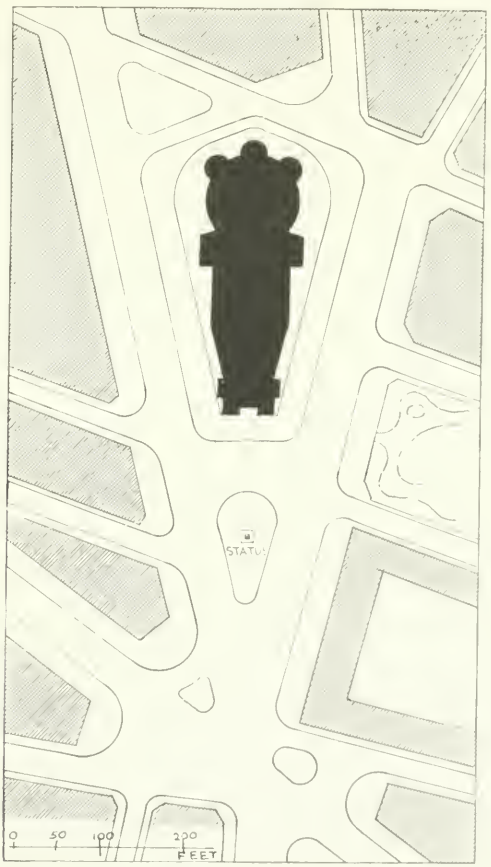


Fig. 170. PLACE ST. AUGUSTIN, PARIS

gardens. It is of course difficult for the designer of the place to estimate the probable height of the building to be erected, and the future can generally be left to the sensible treatment of others, if the authorities will only insist on the importance of recognising the necessity of proportion between the width of the place and the height of the adjoining buildings. This class of place demands skilful treatment where it occurs in a position terminating a vista and forming the meeting-place of several traffic arteries. In this respect most of the best examples are to be found in Paris, where the importance of obtaining a series of imposing street vistas has been better realised than in any other city. In mediæval cities, as we have already seen, the centre of a public place was frequently made use of for important buildings with a fine result. In the smaller English towns we often find the market hall placed in the middle of an open place, as at Abingdon and Peterborough, with a very pleasing effect. In larger examples the traffic requirements demand that the buildings shall be set well back from the traffic currents, and the many instances we find of the violation of this rule result in great disturbance to the traffic. The Church of St. Augustin, Paris (Figs. 169 and 170), at the termination of a vista along the Boulevard Malesherbes, is a good example of the treatment of a monumental building on a triangular site, the position being rendered additionally attractive by the close proximity of the Square de Laborde, which affords a fine foreground to the building on the east side.

The Place de l'Opéra and Place de la Madeleine, Paris, and the Gensdarmen Markt, Berlin, are good examples of ornamental places, though varying considerably in

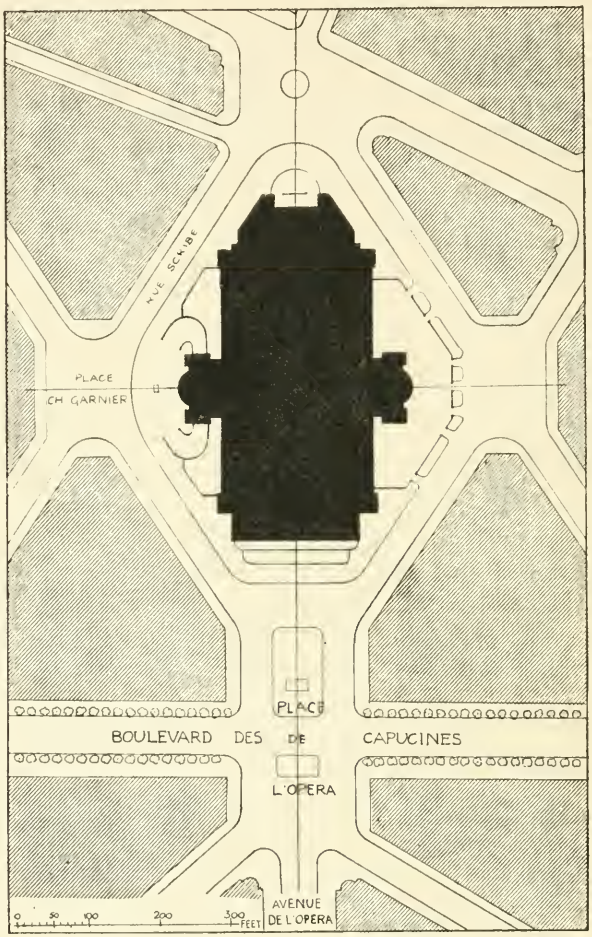


FIG. 171.—PLACE DE L'OPERA, PARIS

their character. The first (Fig. 171) is planned upon a lozenge-shape site overlooking the Place de l'Opéra and terminating a superb vista from the Place du

Théâtre Français along the Avenue de l'Opéra, among the finest vistas in Europe. The entire scheme is perhaps the greatest result of Haussmann's remodelling, and architecturally one of the finest examples of town planning in Europe. When monumental buildings are planned with thoroughfares leading up to them, confusion often results by the creation of cross traffic blocks. This defect has been obviated here by setting

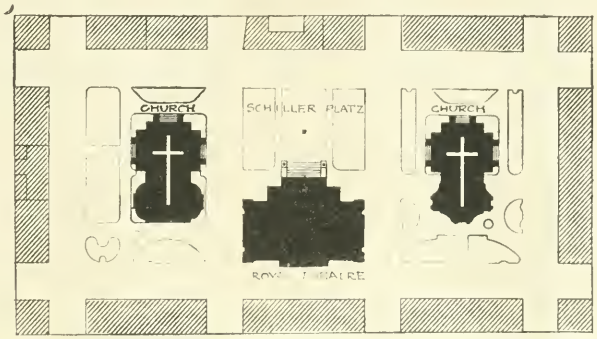


FIG. 172.—GENSDARMEN MARKT, BERLIN

the Opera House well back and by enlarging the cross-roads at the other points of intersection.

The Place de la Madeleine is an oblong place at the junction of two wide boulevards and the Rue Royale; the imposing classic church occupies the greater part of the place, but is set back to allow sufficient space at the junction of the two traffic arteries. The Gensdarmen Markt, Berlin (Fig. 172), is an example of three buildings arranged upon a public place. In this case the traffic is inconsiderable. The Royal Theatre in the centre, with the French Church

and the New Church on either side, form an admirable architectural group; the beauty of the combined outline

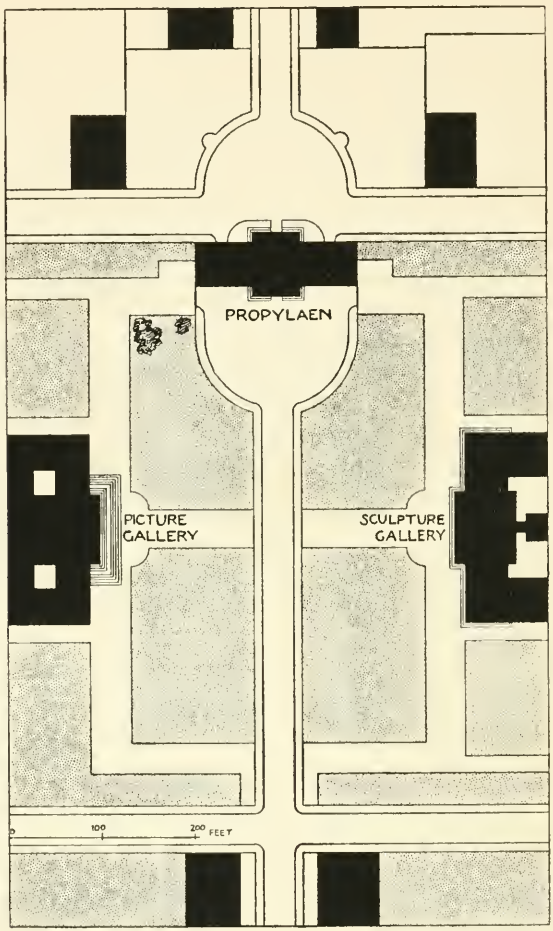


FIG. 173.—KÖNIGSPLATZ, MUNICH

is somewhat marred by the surrounding buildings having been carried to too great a height.

The following sizes of the most important European places, many of which are from dimensions

given by Stübben, form a useful table for comparative purposes :—

	Yards.
Königsplatz, Berlin	248 × 496
Rathaus Platz, Vienna	216 × 432
Place de la Concorde, Paris	238 × 389
Place de l'Étoile, Paris	298 circular
Piazza di S. Pietro, Rome	260 × 368
Place des Nations, Paris	283 circular
Gensdarmen Markt, Berlin	168 × 368
Piazza di Vittorio Emanuele, Rome ...	179 × 341
Railway Place, Milan	216 × 227
Lustgarten, Berlin	195 × 248
Trafalgar Square, London	158 × 168
St. Mark's Place, Venice ...	63 and 98 × 190

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